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Tourists' before and after experience valuations: A unique choice experiment with policy implications for the nature-based tourism industry

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ABSTRACT

The popularity of nature-based tourism revolves around tourist experiences. Tourism, as an experiential good has the potential to impact on tourists' awareness, appreciation, and actions concerning the environment and wildlife. User preferences and valuations of nature and wildlife may change because of the experience. Exploring user valuations of environmental goods before and after the experience is, however, an area that has been given little attention in the literature. We use discrete choice experiments (DCEs) to evaluate tourists' preferences and valuations for nature, wildlife and related services before and after experiencing a nature tour. The results demonstrate how the unfamiliarity of the good consumed (in this case fauna and flora in a hitherto unseen natural environment) affect the non-use valuations of consumers. We find that tourists' valuations for nature and wildlife significantly improve after experiencing the nature tour.

1. Introduction

The value of experiential goods such as tourism revolves around what tourists' experience. It is important for service providers in tourism to understand how their customers' value their experiences (Prakash et al., 2019). Tourism (more so nature-based tourism), which is to a large extent an experiential good involves the connection of human beings with little-known facets of nature, its habitats and wildlife. Through direct experience, consumers (tourists in this case) can, for example, better appreciate nature and wildlife they encounter and enjoy the services offered. Experience, hence, may have a direct impact on consumer utility. This, therefore, has implications for user preferences for before and after experience of the good and the valuations tourists' place on such experiences.

From the consumer's perspective, purchasing a tourism commodity such as a wildlife tour involves a risk. At the point of purchase, the nature tourist has no guarantees that the wildlife species will be even be seen, and the purchasing decision is based on the promise of what constitutes an interesting or appealing experience (or ex ante knowledge) (Curtin, 2005; Kubo et al., 2019). Nature-based tourism experiences are found to be having a positive impact on tourists. Wildlife experiences which are perceived to be intense create a significant emotional attachment to the visited area (Folmer et al., 2013). Nature tourists are likely to develop long-term pro-environmental behaviours with learning

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experiences (Ballantyne and Packer, 2011; Li et al., 2020). This may also achieve the goal of encouraging more responsible environmental attitudes and behaviours. Therefore, gaining insight into how experience may have an impact in changing tourists' preferences and valuations for environmental commodities can be useful.

Experience can also be explained as a means of value formation of consumers. This paper attempts to show how the exposure to the environment itself is an influencing factor in the value formation of tourists. This was first elucidated by Reiling et al. (1990) in their description of the inter-temporal process of value formation. They showed that individual valuations could be different between use values and non-use values, especially for experiential goods. Consumers' direct experience with a good may have an impact on their valuation for that good (Nelson, 1970; Ackerberg, 2003). Studies indicate that where environmental goods are involved, individuals are frequently unfamiliar with them and have no monetary conception of their values (unlike familiar use goods) (Cummings et al., 1986 p. 108; Gregory et al., 1993 p. 181). Accordingly, individual non-use valuations may have reliability issues.

Much of the literature describing the reliability of stated preferences for environmental commodities discusses the effect of information provision on stated valuations (MacMillan et al., 2006; Spash, 2002). A number of contingent valuation studies examined how information provision and experience/knowledge may alter respondents' valuations (Cameron and Englin, 1997; Tisdell and Wilson, 2005; Tisdell et al., 2007, 2008; Tkac, 1998; Li et al., 2014). When given more information, the respondents' choices become more predictable (Czajkowski et al., 2016).

Although a number of empirical studies in the discrete choice experiments (DCEs) literature explore consumer non-use valuations for environmental resources used in tourism, they are often being examined at one point in time (Bostan et al., 2020; Draper et al., 2012; Hearne and Tuscherer, 2008; Naidoo and Adamowicz, 2005). Where environmental goods are involved, the so-called valuations may underestimate or overestimate the actual outcome. Recent DCE literature finds that experiences increase scale factor and therefore makes consumer preferences more predictable (Czajkowski et al., 2015; Tu and Abildtrup, 2016). It suggests that when a consumer feels certain about his or her choices (i.e. through experiences), the choices become more deterministic. Studies such as Matthews et al. (2017) investigate effects of learning and experience on stated preferences by examining the stability of consumer preferences across three time periods. Building on this literature, this paper focuses the attention on examining the experiential aspect of tourist behaviour in nature-based tourism using a before and after experience approach.

Nature-based tourism, being an industry where consumer satisfaction is essentially based on experiences, pre and post examination of user preferences warrants merit. The literature does not satisfactorily provide empirical evidence to address a wider policy framework as to how the tourism stakeholders and policy decision makers could use this phenomenon to improve tourism experiences. This paper, therefore, makes two contributions. Using DCEs; first, it shows how valuations change for experiential goods before and after an experience, an area that is under-researched in the DCE literature. Secondly, the paper draws attention to the implications of the DCE results for policy decision-making in the nature-based tourism industry.

2. Study area

We undertook the field experiment in Sri Lanka, a tropical island country in South Asia, well known by tourists as a destination with authentic environmental diversity and rich cultural heritage. Since 2009 it has been experiencing a postwar tourism boom and attracting large numbers of international tourists each year with an average annual growth rate of 25% in tourist arrivals since 2009 from 447,890 in 2009 to 2,050,832 in 2016 (Sri Lanka Tourism Development Authority, 2016).[2] The primary driver of this growth is Sri Lanka's environmental appeal with anecdotal evidence indicating it is this which attracts most high-paying tourists.

Although Sri Lanka may have environmental features superior to many other tropical destinations, the long-term competitiveness of the country's nature-based tourism is determined by the sustained quality of environmental resources used for tourism. The use of these resources for tourism is often associated with open-access problems such as 'free-riding' which could result in deterioration through overuse (Huybers and Bennett, 2000). We attempt to highlight the importance of bio-diversity conservation for the viability of the tourism industry in Sri Lanka and similar developing country destinations.

3. Method

The stated preference choice modelling technique allows us to create a hypothetical scenario in which respondents are required to choose a preferred alternative from a series of alternatives presented to them. These alternatives are described in terms of a number of attributes that are specified at different levels.

[2] Values from year of end of civil war to the year DCE analysis was started. Annual tourist arrivals were 447,890 (2009), 654,476 (2010), 855,975 (2011), 1,005,605 (2012), 1,274,593 (2013), 1,527,153 (2014), 1,798,380 (2015), 2,050,832 (2016).

Table 1
Attributes and levels.

Attribute	Level	Abbreviation	Explanation
Condition of the natural environment	Excellent	*Nature1*	Uncontaminated wilderness, not crowded, quiet, no development in the vicinity
	Good	*Nature2*	Uncontaminated wilderness, sparsely crowded and quiet, average development in the vicinity,
	Satisfactory[a]	*Nature3*	Moderately crowded, less quiet, few buildings in the vicinity
Number of species to be encountered	More than 100	*Species1*	A large number of mammals, birds and reptiles,
	Between 50–99	*Species2*	A moderate number of mammals, birds and reptiles
	Less than 49[a]	*Species3*	A small number of mammals, birds and reptiles
Quality of the information provided	Specialised guides	*Info1*	Specialised information will be provided
	Non-specialised guides[a]	*Info2*	Non-specialised information will be provided
Three star accommodation, food and recreational facilities	Excellent	*Facilities1*	Met all my expectations
	Good	*Facilities2*	Met most of my expectations
	Satisfactory[a]	*Facilities3*	Met some of my expectations
Cost of the tour (per person)	US$ 2000	*Cost*	
	US$ 1500		
	US$ 1000		

[a]Base/reference case.

3.1. The survey design

The DCE was conducted with the involvement of ten destination management companies which undertake nature-based tours in Sri Lanka. The tours include visits to various natural attractions such national and wildlife parks (for example, Yala National park and Udawalawe National Park) where international tourists can have first-hand experience in nature and wildlife watching. The survey was conducted between November 2014 and May 2015. These months typically include the peak season for tourist arrivals in the country. The length of the tour was approximately nine days.

The field experiment included paper and pencil questionnaires. Each tourist was given a pack of two similar questionnaires for self-completion: one to be completed at the beginning of the tour (pre-visit questionnaire) and the other at the end of the tour (post-visit questionnaire).[3] We gave each respondent identical choice sets to complete in both before and after the tour. They were instructed not to cross reference between questionnaires when making choices (the tour guides were instructed to monitor this). The questionnaires were made available in four languages (English, French, Japanese and German) to capture respondents from different nationalities. Distribution and collection of the questionnaires were done by the tour guides from the respective company.

3.2. Attributes and levels

The attributes and levels used in this study were carefully chosen and developed following an extensive literature review of previous research. Revisions to attributes and levels were made after discussions with a number of experienced tour operators, managers and tourism scholars. We defined five attributes – four with three levels and one with two levels – and which were based on experiences that a participant would potentially receive by taking part in a nature tour in Sri Lanka. These attributes were qualitative in nature except for the cost attribute which was quantitative. The list of attributes and levels are displayed in Table 1. Examining tourists' experiences, being a primary focus of this paper, each of the selected attribute contributes to enhancing tourists' experiences during a nature tour.

(i) The condition of the natural environment: This attribute describes the level of environmental quality in national parks and surrounding areas. The quality is defined by the amount of pollution, visitor crowdedness and the level of development in the vicinity. The three assigned preference levels for this attribute are excellent, good and satisfactory.

In Sri Lanka, national parks such as Yala and Hurulu Ecopark & biosphere reserve experience congestion as sighting wildlife during peak months of December and January (Newsome, 2013). Vehicle congestion (from sight-seeing or safari vehicles) produces noise and fumes that disturb not only wildlife-viewing but also the habitat of wildlife species. The cumulative costs of pollution created by improper waste disposal have substantial impacts on the environmental integrity of Yala national park (Buultjens et al., 2005). Nevertheless, minimal crowding and less pollution constituting good ecotourism practices can still be observed in areas such as Bundala National Park (Newsome, 2013).

[3] Various measures were taken to ensure respondents filled in the pre-visit questionnaire at the beginning of the tour and vice versa. They include printing pre-visit and post-visit questionnaire in different colours, providing clear instructions to tour guides on how to conduct the survey and providing simple straightforward guidelines at the beginning of each questionnaire.

The underlying assumption is that an uncontaminated and uncrowded wilderness is preferable than an environment which is crowded and has experienced a level of development. This study expects that high level of congestion/pollution and modifications in national parks would appeal more negatively to nature tourists and would reduce the probability of making a visit. Some studies indicate that crowding negatively affects the quality of tourism experiences (Huybers and Bennett, 2000; Kohlhardt et al., 2018; Newsome et al., 2017). However, the DCE conducted by Wang et al. (2014) shows how the probability of choosing an alternative increased as the level of crowding is only moderately reduced. Large visitor numbers to national parks are found to result in welfare losses and decreases in the welfare of tourists (Juutinen et al., 2011). Further, Brau (2008) found that tourists are averse to the substantial modifications of a natural environment.

(ii) Number of species to be encountered: This attribute refers to the chance of encountering wild species during the tour (observing wild species in a natural setting being one of the key features of a nature tour). This attribute captures the biodiversity and availability of species in numbers. The defined levels are more than 100, between 50–99 and less than 49.

National parks and wildlife sanctuaries in Sri Lanka consist of a wide variety of mammals, birds and reptiles including certain threatened species. Yala, the most heavily visited national park in Sri Lanka has a rich biodiversity including an estimated 200 elephants, a very high density of leopards and many other species such as the sloth bear, the spotted deer, the sambar, wild buffalo, jackals, monkeys and crocodiles (Buultjens et al., 2005). It was assumed that the possibility of encountering wild species would appeal more positively to highly motivated nature tourists. The rationale behind the selection of the particular attribute is to observe tourists' perspective towards biodiversity conservation in national parks. As Juutinen et al. (2011) pointed out, high level of biodiversity in national parks is preferred by the visitors as opposed to low levels (also confirmed by Birol et al., 2006; Tyrväinen et al., 2014).

(iii) Quality of the information provided: The third attribute refers to the type of information and interpretation services provided to the tourists during the tour. They are an important component of a nature tour helping to disseminate information about wild species and act as an interface between tourists and wildlife. They are also able to educate tourists and minimise unwanted behaviours such as trampling and creating noise (Curtin, 2010). Interpretative facilities generate an interest in tourists and fosters an element of connection with the natural environment they visit. Tour guides facilitate in making a tour a satisfying experience for tourists. The levels for this attribute are defined as specialised guides and non-specialised guides.

The availability or provision of information for tourists is presented in various ways in the DCE literture. Hearne and Salinas (2002) define information as interpretative signs on trails, pamphlets and information centres. Nevertheless, they discovered that tourists had a significant preference for greater information (also see, Hasan-Basri and Abd Karim, 2016). Hearne and Santos (2005) found that tourists prefer wildlife viewing with expert guides. The research hypothesis is that tourists have a greater preference for specialised information over non-specialised information.

(iv) Three star accommodation, food and recreational facilities: This attribute is aimed at capturing tourists' preferences for accommodation and related facilities during the period of the tour. Since this attribute consists of three components, only three star accommodation is included in the DCE scenario in order to simplify the decision making process. Moreover, consistency in the level of accommodation helped to determine the levels in the price attribute. The three levels are defined as excellent, good, and satisfactory.

This study assumes that the better the facilities, the higher will be the utility of tourists. Lacher et al. (2013) found that high quality of dining experience was expected by the tourists visiting South Carolina Coast.

(v) Cost of the tour: The cost variable or the payment vehicle was defined based on how much a tourist would pay for a 7-day nature and wildlife tour package if accommodated in a 3-star hotel. It is noted that this excludes the airfare. Since there is a difference in tour costs from one tour company to another, the levels for this attribute were taken as an average of how much an individual tourist would pay for a tour. We present this attribute with three levels: US$ 1000, US$1500 and US$2000. As expected, a lower cost is generally preferred (see, for example, Birol et al., 2006; Lee et al., 2016; Viteri Mejía and Brandt, 2015; Chen et al., 2019).

3.3. Choice experiment

Respondents were presented with a hypothetical scenario in which they undertake a nature tour of 7 days with a destination management company. They were asked to consider various trip packages and experiences and choose a preferred option based on what they are willing to pay for each alternative. Respondents had to choose between three unlabelled alternatives and a 'no-choice' option. The no-choice or opt-out option was included because it reflects real market choice behaviour. That is, it provides a higher degree of reality given the surveyed tourists are not forced to choose a trip in which the configuration of attributes does not match with their preferences. An illustration of a choice scenario is presented in Fig. 1.

A full factorial design producing all possible combinations of attributes and levels would allow all the main and interaction effects to be estimated. However, in practice, use of such a large design is impractical. This was reduced using an experimental fractional factorial design. We used an orthogonal design with a foldover using NGENE software to reduce the number of choice scenarios to 36. The 36 scenarios were further blocked into 4 with each questionnaire containing 9 choice sets.

ASSUME THAT THE FOLLOWING ARE THE ONLY CHOICES AVAILABLE TO YOU WHEN UNDERTAKING THIS TOUR. BASED ON THIS WHICH ONE OF THEM WOULD YOU PICK?

	Trip 1	Trip 2	Trip 3
Condition of the natural environment	Satisfactory	Good	Excellent
Number of species to be encountered	More than 100	Between 50-99	Between 50-99
Quality of the information provided	Non-specialised guides	Specialised guides	Non-specialised guides
Three star accommodation, food and recreational facilities	Excellent	Good	Good
Cost of the tour	US$ 1000	US$ 1500	US$ 2000

I would choose Trip 1 ☐
I would choose Trip 2 ☐
I would choose Trip 3 ☐
I would choose none ☐

Please tick only one box

Fig. 1. Example of a choice scenario.

Out of the 440 sets of questionnaires distributed among different tour operators, 230 completed sets were returned for an effective response rate of 52.3%.[4] Of the completed ones, 10 were not included because of non-responses to relevant variables in the analysis and/or partially completed returns (e.g. only pre-visit or post-visit completed). An additional 8 were left out to maintain an equal number of respondents from each block. Therefore, the final sample size was 212 respondents.[5] The cost variable was scaled down in the modelling stage (e.g., cost divided by 1000).

4. Econometric framework

DCEs rely on McFadden's random utility theory (McFadden, 1974; Thurstone, 1972), where choice is assumed to be made on the basis of relative utilities derived from alternative options available in a choice set. It states that there is an observable as well as an unobservable component in the choice behaviour.

Considering the mixed logit model (MXL), the utility of tourist n gains from choosing a trip alternative can be expressed as;

$$U_{ni} = \beta_n' x_{ni} + \varepsilon_{ni} \tag{1}$$

β_n is a vector of utility coefficients of observed variable x_{ni} for respondent n. ε_{ni} is the unobservable random component. Assuming type I extreme value distribution for ε_{ni} the choice probability conditional on β_n is defined as:

$$L_{ni}(\beta_n) = \frac{exp(\beta_n' x_{ni})}{\sum_{j\epsilon C} \exp(\beta_n' x_{nj})} \tag{2}$$

where C denotes a respondent's choice set.

As we have no information about each respondent's tastes, denoted by $f(\beta|\Omega)$, where Ω are the parameters of this distribution, the probability that we ascribe for the respondent is the integral of $L_{ni}(\beta_n)$ over all possible values of β_n:

$$P_{ni} = \int L_{ni}(\beta_n) \cdot f(\beta|\Omega)\, d\beta \tag{3}$$

In addition to taste heterogeneity, the generalised mixed logit model (GMXL) also captures scale heterogeneity across respondents, that is, a variation on the variance condition associated with the random component (Fiebig et al., 2010; Greene and Hensher, 2010; Hensher et al., 2015).[6] Scale heterogeneity across choices can be identified as:

$$\beta_n = \sigma_n \beta + [\gamma + \sigma_n (1-\gamma)] \Gamma w_n, \quad w_n \sim N[0,1], 0 \le \gamma \le 1; \tag{4}$$

$$\sigma_n = \exp(-\tau^2/2 + \tau v_n), \quad v_n \sim N[0,1] \tag{5}$$

where Eq. (5) represents the standard deviation of the individual specific scale factor, and τ captures the unobserved scale heterogeneity. The random scaling factor, σ_i has mean 1 and variance $\exp(\tau 2 - 1)$.

[4] Given the two-stage nature of the survey, the above response rate was considered adequate.

[5] Our sample size is consistent with the sample size rule of thumb for DCEs proposed by Orme (1998) & Johnson and Orme (2003).

[6] It is noted that MXL allows for all forms of correlation, including scale heterogeneity (Hess and Train, 2017), although it does not separately identify the various sources of correlation.

Table 2
Respondent demographics.

Demographic characteristic	Total (N=212) N (%)
Gender	
Male	98 (46.2)
Female	114 (53.8)
Age	
18 to 40	47 (22.2)
41 to 60	120 (56.6)
61 and above	45 (21.2)
Education	
Primary	0 (0.0)
Secondary	47 (22.2)
Tertiary	165 (77.8)
Employment	
Employed	163 (76.9)
Unemployed/students	8 (3.8)
Retired	38 (17.9)
Other	1 (0.9)
Income	
Below US$ 20,000	21 (9.9)
US$ 20,001–50,000	70 (33.0)
US$ 60,001 and above	121 (57.1)

Where two models are involved (pre-visit and post-visit in this case), the combination of multiple datasets requires the decomposition of scale heterogeneity to identify data-specific scale effects, such that τ becomes a function of a series of dummy variables identifying the presence of scale heterogeneity between distinct datasets:

$$\tau = \tau + \eta d_s \tag{6}$$

where η is a dataset specific scale parameter and $d_s = 1$ for data source s and 0 otherwise.

The WTP is generally estimated as the ratio of the marginal utility of one attribute and the marginal disutility of price. In GMXL models, the cost parameter may be specified as random or non-random and the model can be reparametrised to estimate parameters in WTP space. The resulting β directly provides the WTP estimates.

5. Results

5.1. Tourist demographics and background information

The majority of the sample were aged 41 years or older (78%) and were females (54%). Over three quarters of the sample were employed (77%) and had a tertiary education (78%). 57% reported an income of US$ 60,001 and above. The main socio-demographic characteristics of the sample are presented in Table 2.

The questionnaire included a section which recorded background information on respondents' decision to take part in the tour and preferences which are not captured in the choice experiment. The summary of the responses is shown in Table 3. 96% of the sample claimed that the tour was their first visit to Sri Lanka. Some 63% travelled with family or a partner. The responses indicate that 'experiencing nature' is a substantial part of their decision to visit Sri Lanka. 84% of the sample (64% + 20%) indicated that wildlife, scenic beauty and beaches were the motivations to visit Sri Lanka (multiple options were allowed). 10% of the sample was interested in adventure tourism, an activity which depended on a considerable extent on natural environmental resources. 90% considered seeing wildlife as an important part of their tour. A further 25% declared that they were a member of a nature conservation organisation. The above results provide reasonable evidence that most respondents held a genuine concern for the natural environment – a view subsequently reflected in the choice experiment outcomes.

5.2. Models in preference space

Data obtained from the questionnaires were analysed using the econometric software NLOGIT 6.0. Apart from the numerical cost attribute, which is continuously coded, all other qualitative attributes included in the estimations were effects coded.

The model parameter estimates, and their associated standard errors (SE) are displayed in Table 4. In examining whether preferences varied after the experience, separate models were estimated for pre-visit and post-visit scenarios

Table 3
Background information of study respondents.

Background information	Total (N=212) N (%)
First visit to Sri Lanka	
Yes	204 (96.2)
No	8 (3.8)
Travel arrangements	
Travelling alone	78 (36.8)
With partner/family	134 (63.2)
Motivation to travel to Sri Lanka[a]	
Wildlife/ scenic beauty	136 (64.2)
Beaches	42 (19.8)
Heritage/ culture	68 (32.1)
Adventure (surfing, white water rafting, snorkelling, hiking etc.)	21 (9.9)
Food	8 (3.8)
Other (please specify)	13 (6.1)
Importance of seeing wildlife	
Very important	117 (55.2)
Important	74 (34.9)
Not very important	21 (9.9)
Of no importance	0 (0.0)
If no or fewer wildlife were to be seen in Sri Lanka, would you still have visited Sri Lanka?	
Yes	19 (9.0)
No	98 (46.2)
Unsure	95 (44.8)
Member of nature conservation organisation	
Yes	53 (25.0)
No	159 (75.0)

[a]Answering multiple options was allowed; percentages do not sum to 100%.

using MXL model (model 1a and model 1b) and GMXL model (model 2a and model 2b). The pre-visit and post-visit GMXL models (model 2a and model 2b, capture scale heterogeneity (in addition to preference heterogeneity) within the model. Additionally, a GMXL model was estimated for pooled data (pre-visit and post-visit combined dataset) to account for data-specific scale effects (Model 3). This model captures scale heterogeneity within model and between datasets.

The estimated coefficients of each attribute level show the effect of the attribute level on the indirect utility of choice options. Although the results of this study are limited to estimating the impact of main effects only, these account for 70%–90% of utility (Dawes and Corrigan, 1974). The models were estimated using maximum simulated likelihood methods with 500 Halton draws.[7] The constant was kept as a non-random parameter as a conventional procedure (Fiebig et al., 2010). The adjusted McFadden Pseudo R-squared and percentage of correctly predicted choices were used to assess model performance. The attribute level coefficients are generic and, therefore, apply equally to each trip alternative.

As given in Table 4, the results were compared for pre-visit and post-visit models for the different model types used. The GMXL model slightly outperforms the MXL based on log likelihood and pseudo R-squared. The signs of the coefficients for all attributes are in accordance with priori expectations, i.e., a negative sign for the cost attribute and positive signs for higher levels of other attributes.

Models 2a, Model 2b and Model 3 accounted for scale heterogeneity within the data denoted by the variance parameter in scale (tau) which is found to be statistically significant. This suggests the presence of scale heterogeneity, such that respondents in our sample varied in terms of certainty/consistency in their choices. Model 3 (pooled) also accounted for scale heterogeneity between pre-visit and post-visit datasets indicated by the heterogeneity in scale factor. We allowed the difference in scale factor between the two datasets through the inclusion of a dummy variable d_s (pre-visit=0; post-visit=1) associated with η. The results support the existence of scale heterogeneity between distinct datasets, namely greater variance in unobserved heterogeneity in pre-visit sample compared to the post-visit sample (see for example, Lourenço-Gomes et al., 2020; Schaafsma et al., 2014). After accounting for scale, order of importance of parameters slightly changes in model 2a compared to model 1a. The significant standard deviations for the random parameters show the presence of individual preference heterogeneity among respondents for all attribute levels.

Comparisons have been made between pre-visit and post-visit scenarios. Note that we have used better performing GMXL models (model 2a and model 2b) for interpretation of results below.

Condition of the natural environment: Tourists clearly prefer a natural environment which is in excellent condition (Nature1) given this choice has highly significant coefficients. Nature2 attribute level has negative coefficients (but not significant) which may imply tourists' aversion to contamination of nature, crowdedness and development activities in

[7] The panel nature of the data (9 choice sets per respondent) is accounted for in the estimation.

natural attractions. Nature1 coefficient considerably improved in post visit scenarios. The results confirm findings by Kohlhardt et al. (2018), Wang et al. (2014), Schuhmann et al. (2013), Oh et al. (2009), Brau et al. (2009), Huybers (2003) and Huybers and Bennett (2003) where tourists had strong preferences for attributes related to a quality of the environment in each study (e.g. noise, crowdedness, unspoilt condition of the environment).

Number of species encountered: The highly significant and positive coefficients for Species1 imply that tourists are interested in encountering as many species as possible during their tour. We observe a large and positive shift in Species1 from pre-visit to post-visit scenarios which may suggest that the tour experience improved their utility gained from encountering more wildlife. As found in Faccioli et al. (2015), Tyrväinen et al. (2014) and Juutinen et al. (2011), we observe that a decrease in biodiversity reduces the probability of choosing an alternative. The results also replicate Ballantyne et al. (2011a)'s findings on the contribution of wildlife viewing on visitor satisfaction.

Quality of information provided: The results reveal that tourists have a significant preference for specialised guides indicating preference for greater information about nature and wildlife. The coefficients are highly significant in both models (model 2a and model 2b). The results confirm the findings of Hasan-Basri and Abd Karim (2016), Draper et al. (2012) and Li et al. (2020) on the importance of information/interpretative facilities in determining user satisfaction in tourism. Such services are educational and have an impact on tourists' attitudes towards conservation (Ballantyne et al., 2011b).

Accommodation, food and recreational facilities: The results indicate that tourists prefer tours inclusive of excellent accommodation, food and recreational facilities indicated by a significant and positive coefficient for Facilities 1 in model 2a and model 2b. Moreover, the coefficient increased during the post-visit model for this attribute as shown in Table 4. The results obtained for the above attribute levels are in line with the findings of past studies. Past studies discovered the importance of recreational facilities having varied level of influence on a tourist's utility and destination choice (Lacher et al., 2013; Chen et al., 2019). Quan and Wang (2004) claims that an unsatisfying accommodation experience would negatively affect the whole travel experience.

Trip cost: The coefficient for the cost attribute is negative for all models reflecting a significant preference for a lower trip cost.

We found that the coefficient values for higher levels were greater than the coefficient values for lower levels in each attribute. This indicates that the marginal utility received by higher levels is greater than that of lower levels. That is the utility received by a consumer increases if the quality/quantity of the good consumed (in this case the nature tour) increases. The behaviour of coefficient values from pre-visit to post-visit for all qualitative attributes indicates that, overall, there is an increase in marginal utility received by a consumer after the tour experience and, therefore, the provision of nature-based tourism services has shown success in meeting the tourists' needs.

Effects coding resulted in contrasts between the coefficients of the levels of each attribute. The coefficient of the base level of each attribute can be calculated using the estimated coefficients of the other attribute levels. For example, when there are 3 levels for an attribute, the value for base level is equal to the negative of the sum of the two estimated coefficients. Fig. 2 graphically demonstrates tourists' order of preferences for different levels of each attribute and how they change after the tour experience (calculated from GMXL single sample models). The utility increments between different levels of each attribute generally appear non-linear. The leap in coefficients from pre-visit to post-visit for Nature 1 and Species1 is quite large indicating that tourists had a high degree of satisfaction from their experience. Although, specialised guides are noticeably preferred over non-specialised guides, we do not observe a rise in the coefficient between pre-visit model to post visit model (model 2a to model 2b)- refer Table 5 for further WTP analysis for this. Additionally, tourists are shown to prefer greater quality of accommodation, food and recreational facilities during the tour. The coefficients which relate to each level indicate that Facilities1 and Facilities2 have a positive relationship with indirect utility. But while tourists are averse to lower levels of service, the coefficients are relatively lower meaning accommodation, food and recreational facilities are not major factors in determining the overall utility of tourists.

We further estimated the attribute importance which is defined as the absolute change in utility associated with an attribute. Using the approach suggested by Gonzalez (2019), this measure of importance represents the overall positive or negative effect that an attribute has on individuals' well-being relative to other attributes. The relative importance of each attribute was calculated by determining the difference between the minimum and maximum coefficients of each attribute, and to calculate as a percentage, the difference is divided by the sum of the differences between all the coefficients of all the attributes. Fig. 3 presents the relative importance of each of the attributes in the pre-visit and post-visit scenarios calculated using the GMXL single sample models.

Cost of the tour was considered the most important attribute in both models. After cost, in pre-visit models, respondents considered quality of information, condition of the natural environment, number of species and accommodation, food and recreation as the order of importance. This order of importance slightly changed in the post-visit models.

5.3. Models in WTP space

The GMXL preference space models (model 2a and model 2b) presented in Table 4 were estimated in WTP space as given in Table 5. Coefficient signs in the WTP models need to be reversed as the coefficient of cost was fixed. The cost variable was scaled down for modelling, therefore the values need to be multiplied by 1000 for interpretation.

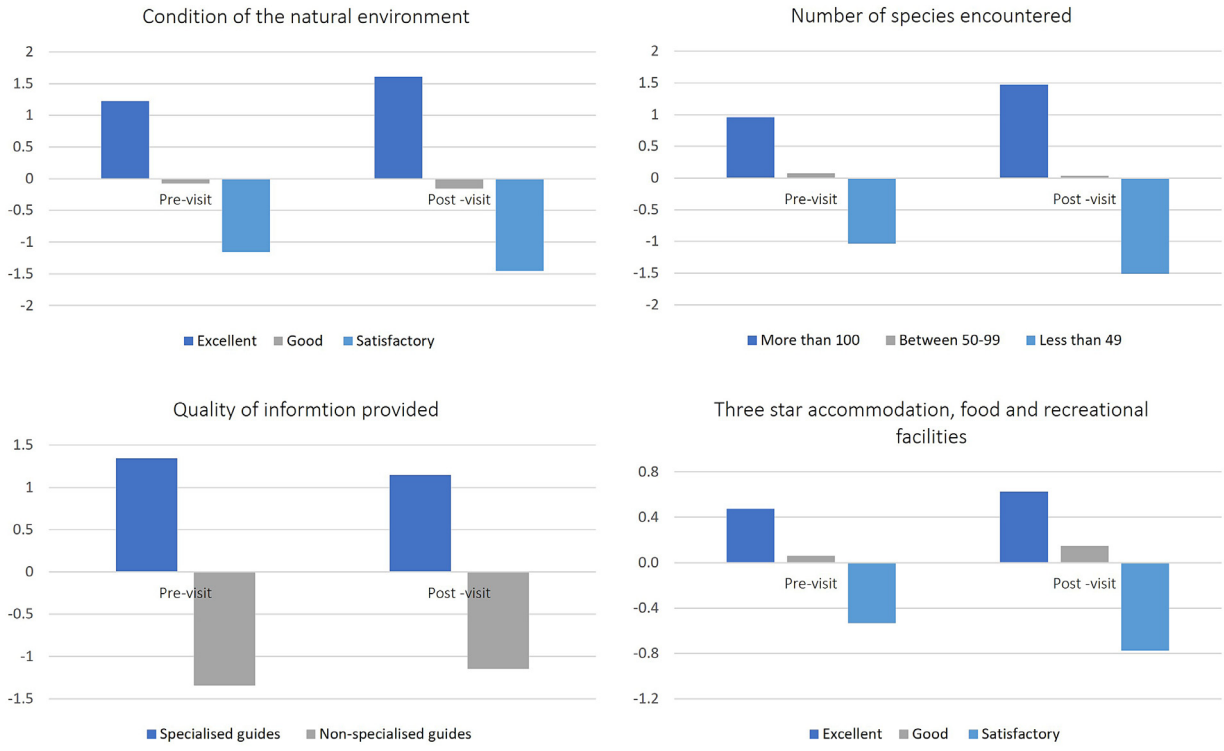

Fig. 2. Estimated coefficients of qualitative attribute levels.

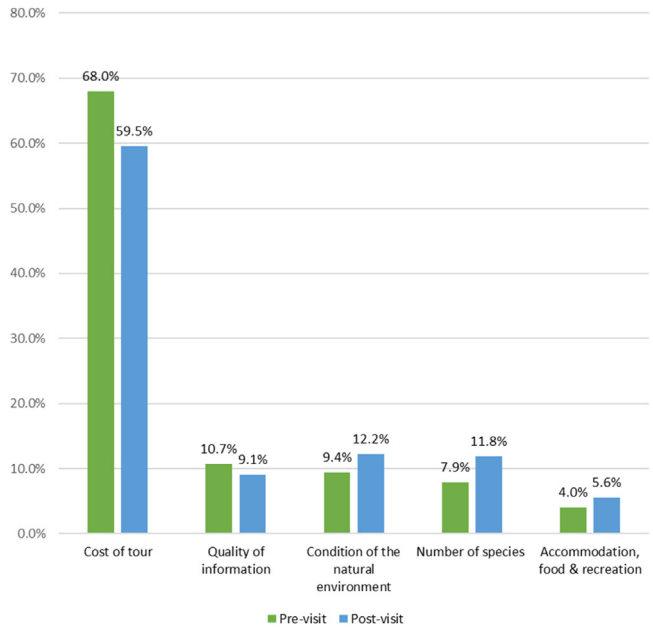

Fig. 3. Relative attribute importance. Note: Please refer Table 4 for parameters used to calculate attribute importance.

Table 4
Models in preference space.

	MXL						GXML						GMXL Pooled		
	Pre-visit			Post-visit			Pre-visit			Post-visit			Pooled (pre-visit + post-visit)		
	Model 1a			Model 1b			Model 2a			Model 2b			Model 3		
	Coefficient		SE	Coefficient		SE	Coefficient		SE	Coefficient		SE	Coefficient		SE
Random parameters															
Nature1	0.885	***	0.081	1.307	***	0.119	1.228	***	0.170	1.609	***	0.147	1.261	***	0.083
Nature2	−0.010		0.072	−0.076		0.086	−0.077		0.116	−0.153		0.093	−0.084		0.063
Species1	0.720	***	0.100	1.157	***	0.136	0.960	***	0.221	1.471	***	0.153	1.017	***	0.085
Species2	−0.005		0.078	0.042		0.081	0.073		0.159	0.036		0.101	0.056		0.060
Info1	0.948	***	0.091	1.025	***	0.096	1.344	***	0.185	1.145	***	0.110	1.092	***	0.071
Facilities1	0.346	***	0.081	0.393	***	0.098	0.473	***	0.146	0.626	***	0.110	0.437	***	0.071
Facilities2	0.013		0.072	0.221	**	0.089	0.059		0.139	0.148		0.097	0.123	**	0.059
Cost	−1.455	***	0.155	−1.512	***	0.169	−1.712	***	0.261	−1.499	***	0.166	−1.576	***	0.108
Non-random parameters															
Constant	−4.950	***	0.288	−5.507	***	0.356	−5.411	***	0.339	−6.107	***	0.439	−5.231	***	0.240
Standard deviation of random parameters[a]															
Nature1	0.725	***	0.102	1.219	***	0.140	0.535	***	0.168	1.095	***	0.152	0.936	***	0.090
Nature2	0.324	***	0.106	0.643	***	0.102	0.565	***	0.157	0.732	***	0.108	0.546	***	0.072
Species1	0.924	***	0.113	1.495	***	0.168	1.180	***	0.259	1.598	***	0.132	1.177	***	0.094
Species2	0.545	***	0.110	0.387	***	0.101	0.774	***	0.207	0.515	***	0.119	0.351	***	0.084
Info	0.957	***	0.113	0.881	***	0.100	1.274	***	0.200	1.104	***	0.126	0.914	***	0.093
Facilities1	0.600	***	0.161	0.710	***	0.236	0.806	***	0.215	0.875	***	0.130	0.682	***	0.093
Facilities2	0.418	***	0.095	0.735	***	0.118	0.658	***	0.243	0.818	***	0.142	0.565	***	0.108
Cost	1.368	***	0.179	1.392	***	0.154	1.478	***	0.245	1.465	***	0.123	1.224	***	0.083
Variance parameter in scale (τ)							0.708	***	0.084	0.569	***	0.038	0.634	***	0.055
Heterogeneity in scale factor (SP)													−0.440	***	0.162
Weighting parameter (Gamma)							Fixed			Fixed			Fixed		
Sigma sample mean							0.995			0.995	*		0.995	*	
Sigma sample standard deviation							0.772			0.603			0.565		
Log likelihood	−1684.79			−1494.47			−1665.84			−1488.76			−3204.53		
Restricted log likelihood	−2645.05			−2640.89			−2645.05			−2640.90			−5285.94		
Pseudo R2	0.363			0.434			0.370			0.436			0.394		
Correctly predicted	47%			51%			46%			51%			48%		
Number of observations	1908			1908			1908			1908			3816		
Number of respondents	212			212			212			212			424		

Note:*Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level.
[a]These are derived standard deviations of parameter distributions, assumed to be normally distributed.

Table 5
GMXL models in WTP space.

Attribute level	Pre-visit			Post-visit		
	Model 4a			Model 4b		
	Coefficient		SE	Coefficient		SE
Random parameters						
Nature1	−0.584	***	0.053	−0.781	***	0.079
Nature2	0.034		0.047	0.075		0.062
Species1	−0.366	***	0.070	−0.656	***	0.091
Species2	−0.009		0.058	0.030		0.058
Info1	−0.554	***	0.063	−0.612	***	0.064
Facilities1	−0.181	***	0.069	−0.193	***	0.070
Facilities2	−0.056		0.056	−0.168	***	0.058
Cost	1.000	Fixed		1.000	Fixed	
Non-random parameters						
Constant	−4.907	***	0.305	5.850	***	0.344
Standard deviation of random parameters[a]						
Nature1	0.325	***	0.082	0.633	***	0.084
Nature2	0.333	***	0.078	0.356	***	0.069
Species1	0.474	***	0.083	0.796	***	0.103
Species2	0.291	***	0.081	0.208	**	0.093
Info	0.519	***	0.125	0.490	***	0.076
Facilities1	0.400	***	0.128	0.403	***	0.106
Facilities2	0.247	***	0.094	0.385	***	0.092
Cost	0.000	Fixed		0.000	Fixed	
Scale parameter (τ)	0.701	***	0.077	0.669	***	0.062
Weighting parameter (Gamma)	Fixed			Fixed		
Parameter for cost (preference space form)	−1.995	***	0.189	2.139	***	0.154
Standard deviation for cost (preference space)	0.007		0.380	0.296		0.254
Sigma sample mean	0.995			0.994		
Sigma sample standard deviation	0.764			0.723		
Log likelihood	−1701.017			1520.052		
Restricted log likelihood	−2645.049			2640.898		
Pseudo R2	0.355			0.424		
Correctly predicted	46%			51%		
Number of observations	1908			1908		
Number of respondents	212			212		

Note:*Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level.
[a]These are derived standard deviations of parameter distributions, assumed to be normally distributed; Coefficient signs need to be reversed as the coefficient of cost was fixed; WTP estimates needs to be multiplied by 1000.

Similar to preference space models, the WTP space models also demonstrate higher and/or significant coefficients for higher levels for each attribute (i.e., Nature1 as opposed to Nature2; Species1 as opposed to Species2). WTP for Nature1 is at least 3 times higher than Facilities1 in both models. The estimates increase substantially in the post-visit for all significant coefficients. Tourists would be willing to pay US$ 584 for touring in a natural environment which is in excellent condition (Nature1) in the pre-visit scenario and this value rises to US$ 781 after the tour experience. Similarly, tourists would be willing to pay US$ 366 for a nature tour which gives an opportunity to encounter more than 100 species (Species1) and this value rises to US$ 656 post-experience. Furthermore, tourists would be prepared to pay US$ 554 for the provision of specialised information or provision of specialised guides. Indicative of tourists' apparent curiosity to learn about the wide variety of flora and fauna in visited sites, the WTP increases to US$ 612 post-visit.

Heterogeneity denoted by the standard deviations for the random parameters exists in the WTP models for all attribute levels. Further, similar to preference space models, the scale factor (tau) is statistically significant, suggesting the presence of scale heterogeneity, which is accounted for in GMXL models.

A key finding from the derivation of WTP values is that tourists' valuation of nature and wildlife – as expressed by their willingness to learn or educate themselves about the environment – rises as a result of a first-hand experience in national parks and wildlife sanctuaries. Literature confirms that improvement of respondents' knowledge increases their WTP for that good (see for example, (LaRiviere et al., 2014). The change in tourist preferences, as observed by WTP values, is confirmed by the results of the questionnaire in Fig. 4. 15% of respondents stated that they had extremely positive attitudes towards nature conservation before the tour. This rose to almost 29% post tour experience. 33% of respondents stated that they had strong positive attitudes towards nature conservation before the tour while this rose to almost 40% post tour experience.

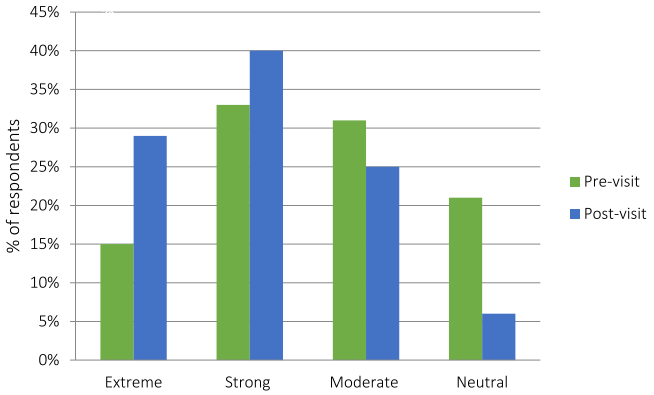

Fig. 4. Tourists' attitudes towards nature conservation.

6. Discussion and implications

This paper uses DCEs to examine tourists' preferences for nature-based tourism and services. The DCE was undertaken in two stages — before and after a tour experience. Identical choice sets were completed by respondents before and after the tour. The key objective of the paper was to investigate how tourists' preferences were affected by such an experience. The overall results indicate tourists' interests in visiting nature-based attractions and, in particular, protected wildlife.

From the results of the GMXL preference space single sample models, a number of initial preferences were revealed. Firstly, the indirect utility for a natural environment was shown to be higher than one with a lower quality. Secondly, encountering more wildlife species were preferred to less. Thirdly, tourists had a strong interest in receiving specialised information. Further, indicated were tourists' preferences for high-quality accommodation, food and recreation. Most of the above preferences were not only replicated in the post-visit scenario but with higher coefficients for attribute levels.

The GMXL WTP space models were used to translate tourists' preferences into monetary estimates. Higher WTP values were observed for (i) quiet, uncrowded and uncontaminated wilderness with no development in the vicinity; (ii) better opportunities for seeing wildlife; (iii) receiving specialised information and; (iv) having higher quality support services. Improved WTP values were reported after the tour experience. This shows how the exposure to the environment can be an influencing factor in the value formation of consumers/tourists.

In light of this evidence, this paper offers suggestions for the future direction of policy making for nature-based tourism in Sri Lanka and similar developing country destinations. Firstly, the study shows that deterioration in current environmental quality and diversity would adversely affect the demand from international tourists (demand for nature tour packages and nature-based tourism in general). Therefore, strategies need to be put in place to protect and preserve natural resources used for tourism. Second implication is directed at industry stakeholders (especially tour operators) in terms of using of experienced guides to provide specialised information about nature and wildlife. Interpretation can increase tourist knowledge, encourage conservation behaviour and enhance environmental awareness (also see, Dearden et al., 2007; Li et al., 2020; Newsome, 2013). Moreover, well-designed and engaging interpretation provide increased visitor satisfaction. Effective interpretation facilities will be useful in the future to avoid problems such as lack of respect for wildlife, off-trail impacts, litter and noise prevailing in national parks (Newsome, 2013). The use of high-quality tour guide training programmes is, therefore, justified.

In the case of Sri Lanka, WTP values derived before and after a tour experience could be used as a guide to set prices more accurately for the resources used in nature-based tourism. For example, the estimated economic values placed by tourists for environmental attributes provides sufficient justification for managers of national parks to increase admission or entrance fees in order to maintain the standard of the environment and thereby avoid the degradation of natural resources (also see Prakash et al., 2019; Wilson and Tisdell, 2004). Peak pricing and visitor caps may help for better environmental outcomes and reduced crowding in national parks (Fleming and Manning, 2015). The above is a possibility in the absence of government budgeting support (Lee and Han, 2002).

The results show a clear message in terms of maintaining national parks in Sri Lanka. Increasing or maintaining biodiversity is essential for the marketing and sustainability of nature-based tourism industry. Nature tourists do not welcome artificial modifications to the natural environment in these sites. Park managers should, therefore, be aware of tourists' aversion to disturbance of wildlife and habitat modifications and deterioration of the environment due to construction and use of recreation facilities (Cole and Landres, 1996; Juutinen et al., 2011). Policies for coping with the consequences of visitor pressure in national parks, outline codes of conduct for tourists and operators and also encourage research into identifying carrying capacities to propose visitor management plans for individual national parks would be beneficial (also see Curtin, 2013).

Overall, this paper presents a useful application of DCEs in nature-based tourism. The two before and after experience, DCEs show how consumer preferences change as a result of experiencing an unseen natural environment. In other words,

this paper demonstrates how exposure to the environment is a significantly important influencing factor in the value formation of tourists as consumers. We note how the unfamiliarity to the good consumed, i.e. nature and wildlife, affects the non-use valuations of consumers. Pre and post experience studies can thus be used as validity tests to obtain accurate consumer valuations for nature.

7. Limitations and future research

While great care was taken in designing and conducting this study, there are some limitations. Firstly, we are aware that the use of an orthogonal design comes with its limitations. This was decided given the time and resource constraints at the time of survey design.

Secondly, the survey consisting of two stages (answering survey questions before and after the tour), as explained in Section 3, focused on tourists who purchased nature-based tour packages only. This is because package tourists are a homogeneous sample and therefore identifying attributes common to such tourists was uncomplicated. However, it would be interesting to expand this sample to include free independent tourists to evaluate their preferences and how they value the nature-based attributes before and after their experience.

The rarity or variety of species and the likelihood of encountering them is likely to be an important attribute for nature tourists. Also, emotional experiences may be important in some instances. Future research on pre and post experience studies may look into these aspects.

All model results indicated the presence of individual preference heterogeneity among the tourists. We expect to investigate this in future research using latent class models which allow for heterogeneity to be captured using discrete distributions.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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