Social-ecological factors influencing tourist satisfaction in three ecotourism lodges in the southeastern Peruvian Amazon

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- We analyse social-ecological factors that influence visitor satisfaction.
- Three typologies of tourists were found based on socio-cultural factors.
- The quality of the lodge has the largest influence on overall satisfaction.
- Ecological features positively influence satisfaction of only one type of tourist.
- Selective marketing focused on *true ecotourists* can be used to improve sustainability.

ABSTRACT

Analysing the factors that influence visitor satisfaction is critical for the proper

management of tourism, particularly in nature tourism enterprises, which are expected to

contribute to biodiversity conservation and the development of local people. In this paper,

we investigate the relationship between different socio-economic and ecological variables,

as well as tourist-operation related factors, on the overall satisfaction of tourists visiting

three Amazonian lodges in Peru. We found three typologies of tourists, differing by several

socio-economic and cultural factors, and by their motivations. The quality of the lodge was

the factor that had the largest influence on overall satisfaction. Only one type of tourist

("true ecotourists") showed a positive relation between their overall satisfaction and

ecological features such as the species observed or cultural features such as operation of the

lodge by native communities using local guides. Implications for management are

discussed in terms of the potential of nature tourism to contribute to sustainable

development in the Peruvian Amazon.

1.   Introduction

Ecotourism represents a small but growing proportion of the world's tourism (Schulte, 2003; TIES, 2006). Given its close relation to nature, ecotourism has the potential to become an important ally of conservation and to contribute to the long-term preservation of Natural Protected Areas (NPAs) and their biodiversity. Moreover, due to their close link with local people, ecotourism enterprises that incorporate a social dimension may become powerful tools for local development. In this way, ecotourism may fight poverty and rural exclusion in NPAs and their surroundings (Alcorn, 1993; Gössling, 1999; Krüger, 2005; Stronza, 2000).

In Latin America, ecotourism is emerging as a new market with substantial development potential due to its biological and cultural diversity (Coppin, 1992; PNUMA, 2003). Currently, ecotourism growth rates exceed those of traditional tourism (Schulte, 2003), particularly in countries such as Belize, Costa Rica, and, more recently, Peru. For example, the number of visitors to NPAs in Peru increased by 250% between 1990 and 1999 (Schulte, 2003). Taking this growth into account, an increasing number of conservationists consider ecotourism a strategic tool to strengthen nature conservation programs and a major source of economic activity that might contribute to local rural development (Lindberg, 1991; Okello et al., 2001; Okello & D'amour, 2008; Stronza, 2000; Stronza & Pêgas, 2008; Tobias & Mendelsohn, 1991; Wunder, 2000).

Peru receives approximately 800 000 tourists per year. Most of these tourists are attracted by Peru's cultural and archaeological richness and its large biological diversity,

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which constitute the country's main attraction for international ecotourists (MINCETUR, 2009). Covering 13.9% of the national territory, Peru currently has 61 NPAs, 13 of which generate income from ecotourism developments (Chávez, 2005). Official statistics show that 7 out of every 10 tourists who visit the country travel to at least one NPA. Macchu Picchu Sanctuary, Manu National Park, Paracas National Reserve, and Tambopata National Reserve are the most visited NPAs, collecting 95% of the national revenue from ecotourism (Chávez, 2005; MINCETUR, 2009). The National Institute for Natural Resources (INRENA) is the governmental institution that is in charge of NPAs and establishes the rules and regulations that affect ecotourism development in these areas. Native communities living inside Communal Reserves can manage these areas with the State through the establishment of co-management contracts.

To maximise the potential of ecotourism as a useful tool for nature conservation and local development, it is critical to know the major social and ecological factors that influence ecotourist satisfaction. This aspect has been widely analysed in relation to wildlife in Africa (Akama & Mukethe-Kieti, 2003; Lindsey et al., 2007; Okello et al., 2001; Williams et al., 2000), Asia (Hasegawa, 2010), and Europe (Oliveira & Pereira, 2008). Devesa et al. (2010) have analysed the relationships between tourist satisfaction and motivation for travel. However, as far as we know, no such studies have been conducted in the Peruvian Amazon.

In the current study, we aim to: (a) characterise the typology of tourists visiting the Tambopata National Reserve (Madre de Dios, Perú), and (b) determine the main social and ecological variables that influence tourist satisfaction. We believe this research will have a

clear practical application in improving ecotourism planning and will strengthen the role of ecotourism in rural development and conservation in the Amazon region.

2. Study area

The research was conducted at Tambopata National Reserve (TNR) and its surroundings, a tropical rainforest area of high natural and cultural value (Erwin, 1984; Gentry & Terborgh, 1990; Foster et al., 1994; Yu et al., 1997). TNR is located on the south part of the Tambopata River in the Department of Madre de Dios, southeastern Peru (9º57'-13º20'S, 68º39'-72º31'O). The TNR comprises 274 690 hectares (see Fig. 1) and is bounded by Bolivia on the west side, by the Bahuaja-Sonene National Park on the south and by the Kotsimba Native Community on the east. The buffer zone of the TNR extends from the Kotsimba Native Community to the Heath River. The Infierno Native Community is located adjacent to the TNR.

Ecotourism at TNR began in 1976 with the building of two lodges located along the Tambopata and Madre de Dios rivers. The ecotourism industry grew during the 1990's, mainly due to the increasing economic stability of the country and the decrease in terrorism, which had severely limited tourism development during the 1980's. The establishment of the Tambopata-Candamo Reserved Zone and the scientific research conducted in this area helped to highlight its international relevance (Kirkby et al., 2000; Kirkby, 2002; Yu et al., 1997). Only three ecotourism lodges existed in the area in 1989,

and the number of lodges increased to 24 in 2002, with a parallel increase in the number of ecotourists visiting the area (from 3000 to 18 000; Kirkby, 2002).

Our research was conducted in three tourist lodges located along the Tambopata River (Fig. 1) and operated by Rainforest Expeditions (RF), a Peruvian company founded in 1992. The three lodges have similar standards but marked differences in their location, years of operation, and management arrangement with local communities:

(a)   *Posada Amazonas* lodge is located inside the territory of the native community of *Infierno*, surrounded by a protected area that covers 3000 hectares. Posada Amazonas is a joint venture ecotourism project between RF and the native community. The partners signed a 20-years contract in 1996 agreeing to split profits, 40% to RF and 60% to the native community. RF is in charge of the logistics and the native community of *Infierno* owns the lodge and contributes their knowledge of the area. This lodge has operated since 1998. The forest around the lodge is managed and preserved by the community members, and hunting and logging are forbidden. It is a well-preserved secondary rainforest containing large trees and endangered and charismatic wildlife species that can still be observed. This lodge received 6613 tourists in 2009.

(b)   *Refugio Amazonas* is a relatively new lodge, operating since 2005. It is located inside the TNR, adjacent to a Brazilian nut concession. The secondary rainforest that surrounds the lodge has large trees, but has been subjected to intense logging and hunting pressure by members of the neighbouring community of Baltimore. The lodge received 4024 tourists in 2009.

(c)　　*Tambopata Research Center* was the first lodge established in the area by RF. It was created as a Biological Station with the purpose of studying the macaw clay lick. It is located inside the TNR, adjacent to the Bahuaja-Sonene National Park (see Fig. 1). The lodge is surrounded by well-preserved primary rainforest, mainly because it is located near a strictly protected National Park and is difficult to access. The lodge has been operated by RF since 1992 and received 1492 tourists in 2009.

3.　Methodology

3.1.　Data collection

Data were collected during June, July and August 2009 in the three ecotourism lodges studied. In each activity/trail, a researcher accompanied the ecotourist group. The researcher recorded ecological data such as the species and number of individuals observed for charismatic mammals (primates, ungulates, giant river otter, and cats), birds (psittacids and representative birds), herpetofauna (frogs, caimans, and snakes), entomofauna (large insects and tarantulas), distinguishing between those observed within 25 m of the trail from those observed further away. The researcher also recorded the weather conditions prevailing during the activity, the different types of forest present (ecological succession state and conservation status), the total duration of the activity, and the length of the trail in kilometres.

Once the activity was completed, the researcher administered a questionnaire to all individual ecotourists of the group. The questionnaire consisted of 11 questions (see

Appendix 1) including nationality, profession, age, main motivation for the visit, income, education level, number of companions, membership of a NGO, previous visits to NPAs, previous visits to tropical forests, how they rated the quality of the lodge and its logistics, and their overall satisfaction with the recent activity/trail. A total of 320 questionnaires were collected in the three lodges: 39% in Posada Amazonas, 35% in Refugio Amazonas, and 26% in Tambopata Research Center. Later, RF provided us with information about the place of origin of the naturalist guide and their valuation of the quality of the guide (based on questionnaires conducted by the enterprise).

3.2. *Data analysis*

First, to identify and characterise the tourists' typology we used a hierarchical cluster analysis, employing the Bray-Curtis distance and Ward's method. The variables used to identify the typology of tourists included socio-economic aspects (i.e., country of origin, profession, age, education level, and income) and environmental and visit attitudes (i.e., whether the tourist was a member of an environmental organisation, the number of NPAs they had visited, previous visits to other tropical forests, the main motivation of the visit, and the number of companions) (Table 1). To characterise each type of tourist obtained in the hierarchical cluster analysis, we used contingency tables (χ^2 test).

Second, to explore which factors influenced the *overall satisfaction* of visitors during their activity, we used non-parametric statistics (Mann-Whitney and Kruskal-Wallis tests). When the Kruskal–Wallis test achieved 90% significance, we used Bonferroni's multiple comparison post-test to compare the *overall satisfaction* of one group with another. To test

the effect of continuous variables on visitors' *overall satisfaction*, we also used Spearman

correlation analyses. The variables used in these analyses were related to ecological aspects

and the specific characteristics of the visit, and to the guide and lodging (Table 1).

Finally, we analysed the joint effect of the ecological variables, guide and lodging-

related variables (see Table 1), and visitors' typology (obtained in the hierarchical clusters

analysis), on the *overall satisfaction* using stepwise multiple regression. The best model

was selected based on a comparison of the adjusted R^2 of various models that consisted of

different subsets of the independent variables. A Principal Component Analysis of variables

was previously carried out to avoid collinearity in the regression analysis. We selected

those factors with eigenvalues > 1 (Kaiser criterion) as explicative factors in the

multivariate regression analysis.

Logarithmic transformation of the continuous variables was necessary to avoid

heteroscedasticity in these analyses. We defined significance at the level $p \leq 0.1$, as our

results were focused on conservation management decisions (Field et al., 2004, 2005).

4. Results

4.1. Identification and characterisation of tourist types

At the highest coefficient of dissimilarity, two different clusters were found: the first

cluster is represented by older visitors who have the highest income, and the second cluster

is represented by younger tourists. At the significance level of 0.05, we identified three

main tourist typologies (Fig. 2), with significant differences in variables such as age ($\chi^2 = 466.2$, p<0.001), education level ($\chi^2 = 63.7$, p<0.001), income ($\chi^2 = 134.3$, p<0.001), and the major motivations for visiting the area ($\chi^2 = 32.8$, p<0.001) (Fig. 3). We did not find association between the type of tourist and lodge (Contingency table analysis, $\chi^2 = 4.9$, p=0.29) (Fig. 4).

Type A tourists were characterised as older than 41 years (mean= 51), having a high income (>50 000 US$/year), postgraduate education (36.4%) and involved in the business (18.8%) and education sectors (23.4%). The main travel motivation of these tourists was to have an experience in the wild (37.7%). Only a quarter of these tourists belonged to an environmental NGO, and a large majority of them had previously visited NPAs and tropical forests.

Type B tourists were characterised as between 21-40 years old (mean= 30), having a high income, postgraduate education (44.3%), and involved in the business (27.8%) or education (24.8%) sectors. Their main travel motivation was seeking an experience (32.2%), and most of them had visited NPAs and tropical rainforests prior to this trip.

Type C tourists were characterised as younger than 21 years old (mean= 18), having a low income (<20 000 US$/year) and not having finished their university studies (66.7%). Their major travel motivation was seeking adventure (35.7%). Only 10% belonged to an environmental NGO. Half of these tourists had previously visited a NPA, but only 23% had visited a tropical rainforest.

4.2.   Variables influencing the level of satisfaction in each tourist type

The overall satisfaction level of Type A tourists was positively correlated with lodge quality. Satisfaction level was higher in lodges that were not managed by a native community. The origin of the naturalist guide and his/her quality did not have an influence on tourist satisfaction level (Table 2). The satisfaction level of this tourist type was significantly higher in trails of intermediate distances, between 2 and 4 km long. Terrestrial activities were positively associated with higher satisfaction levels, but cultural activities showed lower satisfaction levels (Table 2). Type A tourists also showed significantly higher satisfaction levels with activities conducted in primary and pioneer rainforests and lower satisfaction levels with activities conducted in human-transformed forests under agroforestry uses.

Type B tourists showed a positive correlation between overall satisfaction and the quality of the lodge (Table 2). They also showed a higher level of satisfaction with activities guided by a native guide. This type of tourists showed higher satisfaction levels with terrestrial activities and with activities conducted in primary and pioneer rainforest. Lesser satisfaction levels were associated with nocturnal activities. Type B tourists were the only individuals whose satisfaction was significantly related to the observation of charismatic wildlife during the activity. In this sense, their overall satisfaction was positively correlated with the number of mammal and bird species observed along the trail (Table 2).

Similar to the first two tourist typologies, Type C tourists' satisfaction was positively related with the quality of the lodges. However, whether the lodge was managed by a native

community or not did not influence the satisfaction of Type C tourists (Table 2). Regarding the characteristics of the activity, their satisfaction level was not influenced by the number of hours or the distance walked, but showed a significant correlation with weather conditions while on the trail. Type C tourists also showed a significant preference for the activity called *collpa* (clay lick), consisting of the observation of psittacids eating clay on a clay bank. In contrast to the other two typologies, Type C tourists showed a lower satisfaction level with terrestrial activities. There was no significant relation between their overall satisfaction and the forest conservation status or successional state, or the observation of charismatic wildlife species (Table 2).

4.3. *Factors influencing the tourists' overall satisfaction*

A three-factor solution that explained 61.5% of the variance was selected as an adequate explanation of the data (Table 3). Factor 1 (28.5%) was associated with the specific characteristics of the tourist activity, such as the distance covered by tourists during the activity and aquatic activities (both variables exhibited positive scores), the duration of the activity, and the size of the group in the activity (which exhibited negative scores). Factor 2 (17.5%) captured aspects related to the logistics of tourism activity. While positive factor scores reflected the quality of nature guides and terrestrial activities, negative scores were related to the management of lodge by a native community. Factor 3 (14.5%) captured the quality of the lodge.

Finally, in the best model obtained, *overall satisfaction* was explained by Factor 1, Factor 2, Factor 3, and the tourists of Type A and Type B (see Table 4). All variables had a significantly positive effect on the tourists' *overall satisfaction.* Whereas the logistics and quality of the lodge (Factor 3) had a strong influence on tourists' *overall satisfaction*, the aquatic and terrestrial activities with long routes and in small groups of visitors (Factors 1 and 2) had less influence. The quality of the nature guides positively influenced *satisfaction*, but the management by a native community had a negative effect (see Factor 2). Finally, Type B tourists showed a higher level of satisfaction (Table 4).

5.   Discussion

Measuring the level of satisfaction of ecotourists is important as it can serve as a barometer of the "quality" of the service offered and it is a useful tool for designing more efficient conservation and management plans (Foster, 1999; Haber & Lerner, 1998). Our results provide new insights on the social and ecological variables that have a stronger influence on ecotourists' overall satisfaction in the Peruvian Amazon. Most of the tourists visiting the lodges located in the TNR showed a relatively high satisfaction with the activities conducted, but the satisfaction level was highly influenced by the typology and characteristics of the tourists, and by a set of ecological and socio-economic variables that interact in a complex manner.

Three clear and differentiated tourist typologies were identified in the lodges of TNR. Type A grouped older persons with high income and education levels who were primarily

looking for an experience in the wild. This tourist type typically showed a higher level of service requirements, demanding attention and comfort. A second type (Type B) consisted of middle-age persons with high incomes and university level education, who showed greater interest in biodiversity and local cultures. We named them as "true ecotourists" because they were the only ones whose satisfaction was positively correlated with the observation of charismatic wildlife, endangered birds and mammals, and cultural aspects (such as lodge management by a native community, or the presence of native guides). Finally, Type C grouped tourists with low incomes and young-adventurer profiles, whose main motivations and interests were quite different from those of the other tourist types. Motivation has been identified as one of the factors that best characterises tourist's typologies and greatly influences their expectations and overall satisfaction (Devesa et al., 2010).

One of the main features that attract ecotourists to remote NPAs is the possibility of observing singular species, particularly large terrestrial mammals or megafauna (Naidoo & Adamowicz, 2005; Okello et al., 2001; Okello et al., 2008; Walpole & Leader-Williams, 2002). The most renowned mammal species in the ecotourism market are typically flagship species found in Africa that, because of their large size, can be easily observed (Krüger, 2005). This constitutes a large advantage over Latin American tropical rainforests, where species are smaller, more evasive, and access to them is more difficult (Groom et al., 1991). Additionally, communication about endangered species from the Amazon remains scarce. For example, species such as the giant river otter are poorly known by most tourists, despite its size and the plentiful opportunities to observe it in oxbow lakes (Steib & Schenk, 1994).

The fame of the Tambopata and Manu regions, in the Department of Madre de Dios, is mostly due to the presence of large *collpas*. On the clay banks, very early in the morning, several species of psittacids feed on clay for physiological and dietary reasons, among others (Brightsmith & Aramburú, 2004; Gilardi et al., 1999; Munn, 1998). The presence of large *collpas* facilitates the observation of psittacids, mainly large macaws of the genus *Ara* that capture greater tourist attention. This explains why they are used as keystone species in the Amazon ecotourism market. In addition, these birds are not only important flagship species for biodiversity conservation fund-raising (Kerley et al., 2003; Walpole & Leader-Williams, 2002), but also for generating important economical benefits for local people inhabiting NPAs or their surroundings (Groom et al., 1991; Munn, 1998). However, it should be highlighted that only Type C tourists showed a higher satisfaction level with the *collpa* activity, although Type B tourists showed a clear correlation between their satisfaction level and the number of charismatic birds observed during the activity.

Our results show that lodge characteristics is the main variable that influenced the tourists' satisfaction level, and was far more important than the other ecological or socio-cultural variables analysed. Logistics in a tropical rainforest involve challenges that are mostly related to the difficulties of operating in remote places with difficult access. However, ecotourists typically demand certain lodge quality criteria, despite the fact that lodges are not expected to be more important than nature and culture in the ecotourism market (Ceballos-Lascuráin, 1996). Several studies show that the characteristics of the lodge do not and should not influence the "true ecotourist" satisfaction level (Mackoy & Osland, 2004; Ceballos-Lascuráin, 2008). Contrarily, our results indicate that this factor

significantly influenced the satisfaction level of all three different tourist typologies identified in the lodges studied in TNR.

The quality of the naturalist guide appears to be another key factor for tourist satisfaction (Bowen, 1999). Good guides are appreciated not only for their knowledge of nature and culture and their ability to identify fauna and flora (Mackoy & Osland, 2004), but also for their capacity to solve logistical problems and fulfil tourists' expectations (Geva & Goldman, 1989). In this study, the multivariate regression showed that the guide's quality influenced the tourists' satisfaction level. Given these results, a continued training program for naturalist guides of TNR appears critical for improving the experience of tourists. This is particularly true for native guides, who are more integrated in ecotourism projects and should be provided the opportunity to transmit their wide knowledge and experience in a more efficient way.

Management by a native community was negatively related with satisfaction level (with the only exception of Type B tourists), likely reflecting the need for greater training and qualification of native people involved with the ecotourism market. Management of a jungle lodge by not specialized personnel is not an easy task. The agreement between RF and the native community of *Infierno* implies a continuous training program for native people in the different tasks required for tourism operation. However, the staff works in rotational shifts and during short periods of time, so that every member of the community has the same opportunities. This implies that there is frequently new staff, increasing the likelihood that mistakes occur that negatively affect satisfaction of the more demanding tourists.

6.   Conclusions

Ecotourism has great potential as a tool to promote conservation in the TNR while benefiting local people who reside in the area. However, ecotourism will not be a panacea for solving the many problems of the region. To increase the efficiency of the ecotourism industry as a sustainable development tool, it will be necessary to improve the planning and management of tourist activities, bearing in mind the various existing tourist typologies when designing tourist products.

Selective target marketing represents a feasible complement to current management practices which focus on tourists who may not necessarily be interested in protecting the local environment or promoting local development (Dolnicar & Leish, 2008). In this sense, selective marketing focused on "true ecotourists" should be maximised in the Peruvian Amazon, as this typology of tourist usually generates a greater aggregated value from a social and environmental sustainability viewpoint.

Joint-ventures between local native communities and specialised tourism companies are likely to be a promising option for ecotourism in the Peruvian Amazon. However, our results show that management by native communities entails some difficulties and can only succeed if there is a solid and continuous training program for local people, particularly for native guides. Given these conditions, joint-venture tourism lodges could become a useful strategy for the conservation of biodiversity and the promotion of human well-being in local communities.

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Figure captions

Figure 1. Study area, showing the three lodges where the research was conducted and the different Natural Protected Areas of the region (BZ= Buffer Zone, TNR= Tambopata National Reserve, BSPN= Bahuaja-Sonene National Park). The reference map shows the position of the study area in Peru and South America.

Figure 2. Results of the hierarchical cluster analysis, showing the three different tourist typologies.

Figure 3. Main characteristics of the three tourist typologies identified.

Figure 4. Percentage of tourist types in the three lodges.

Figure 1
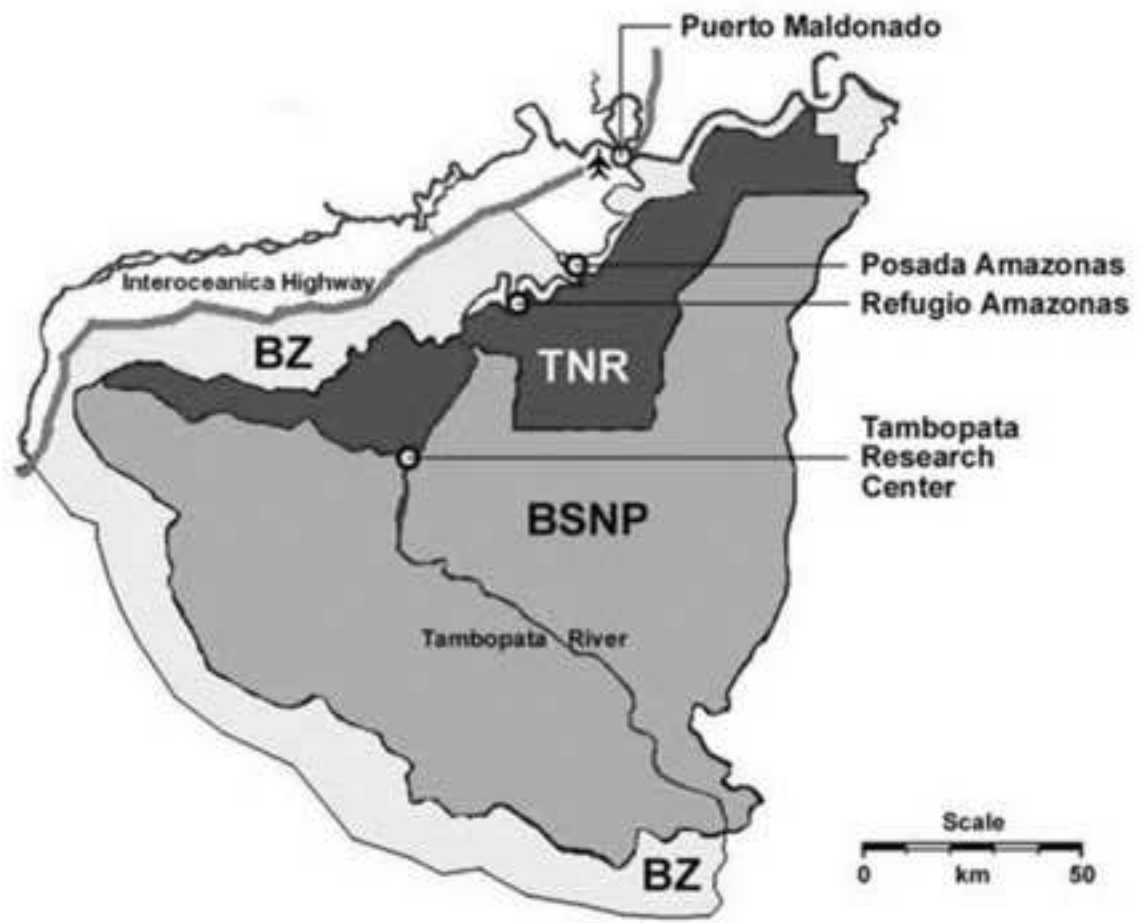**Click here to download high resolution image**

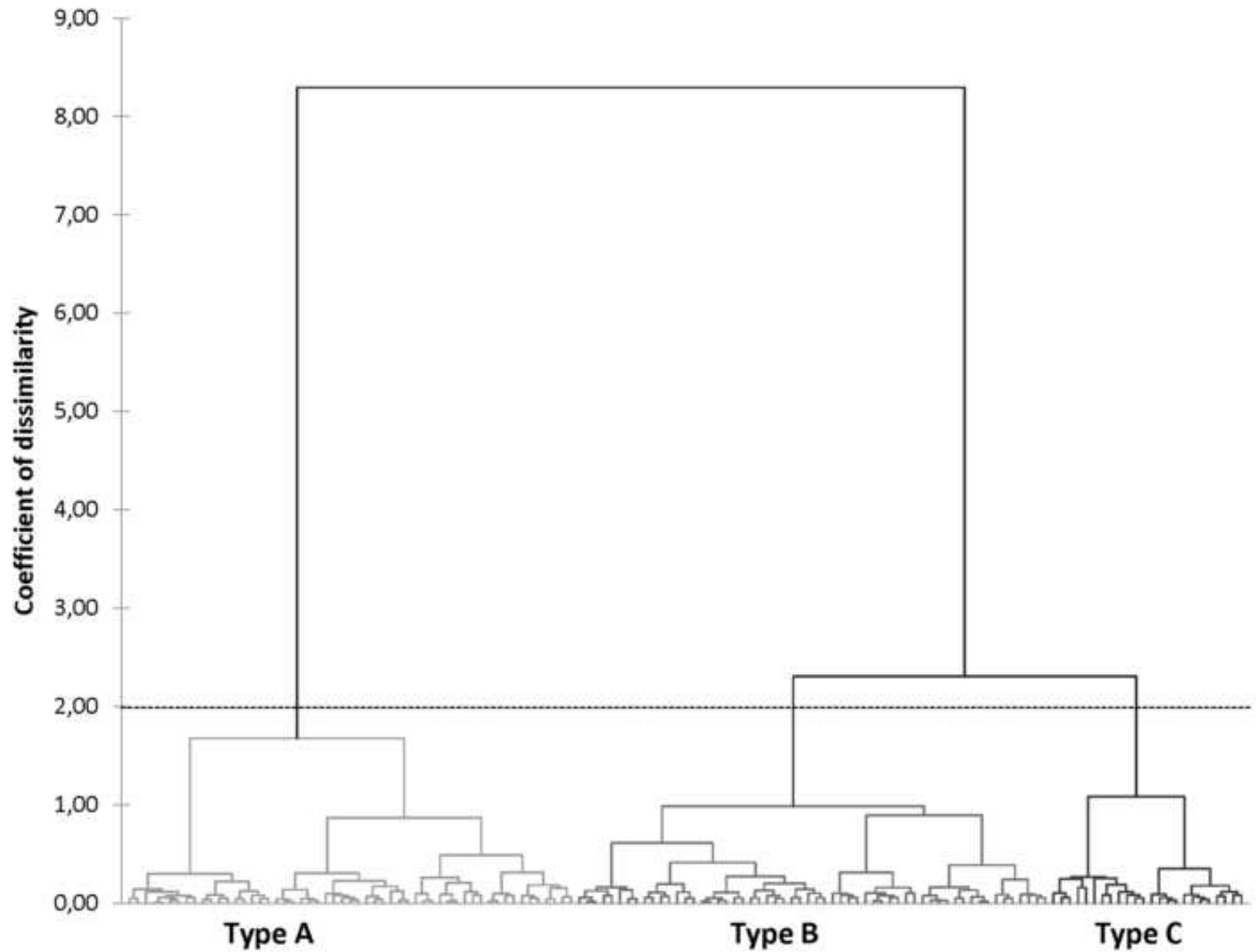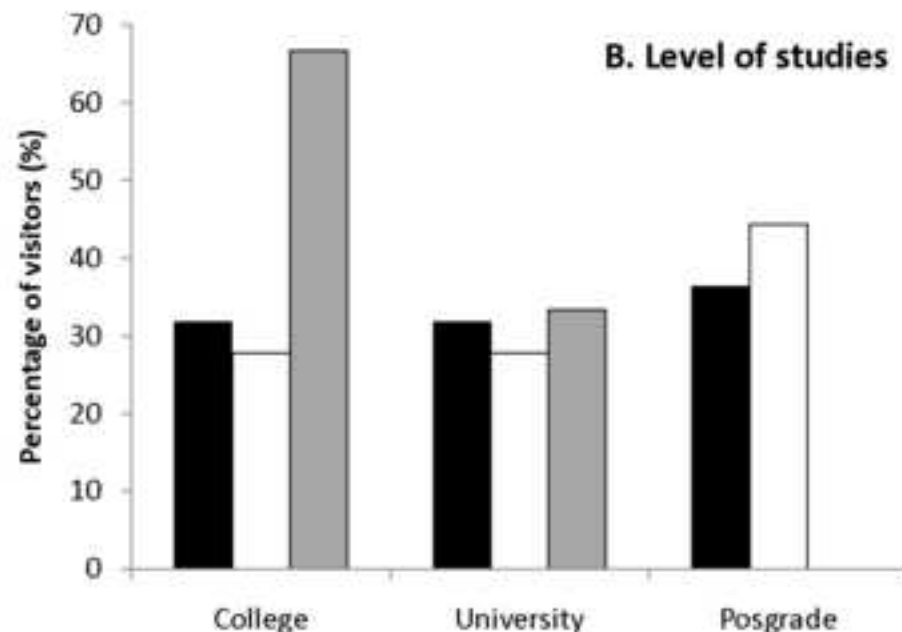**Figure 2**
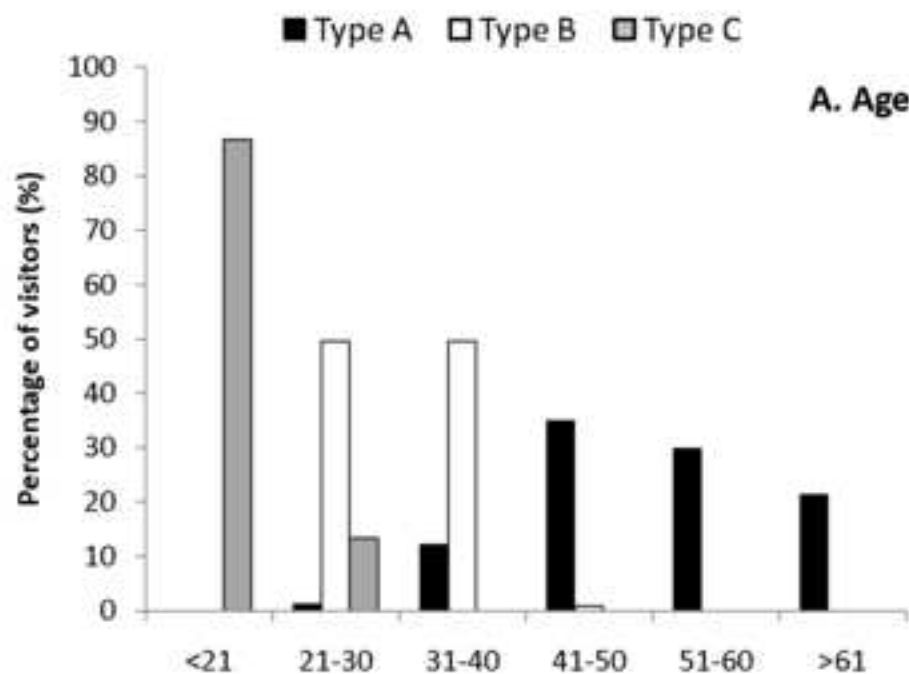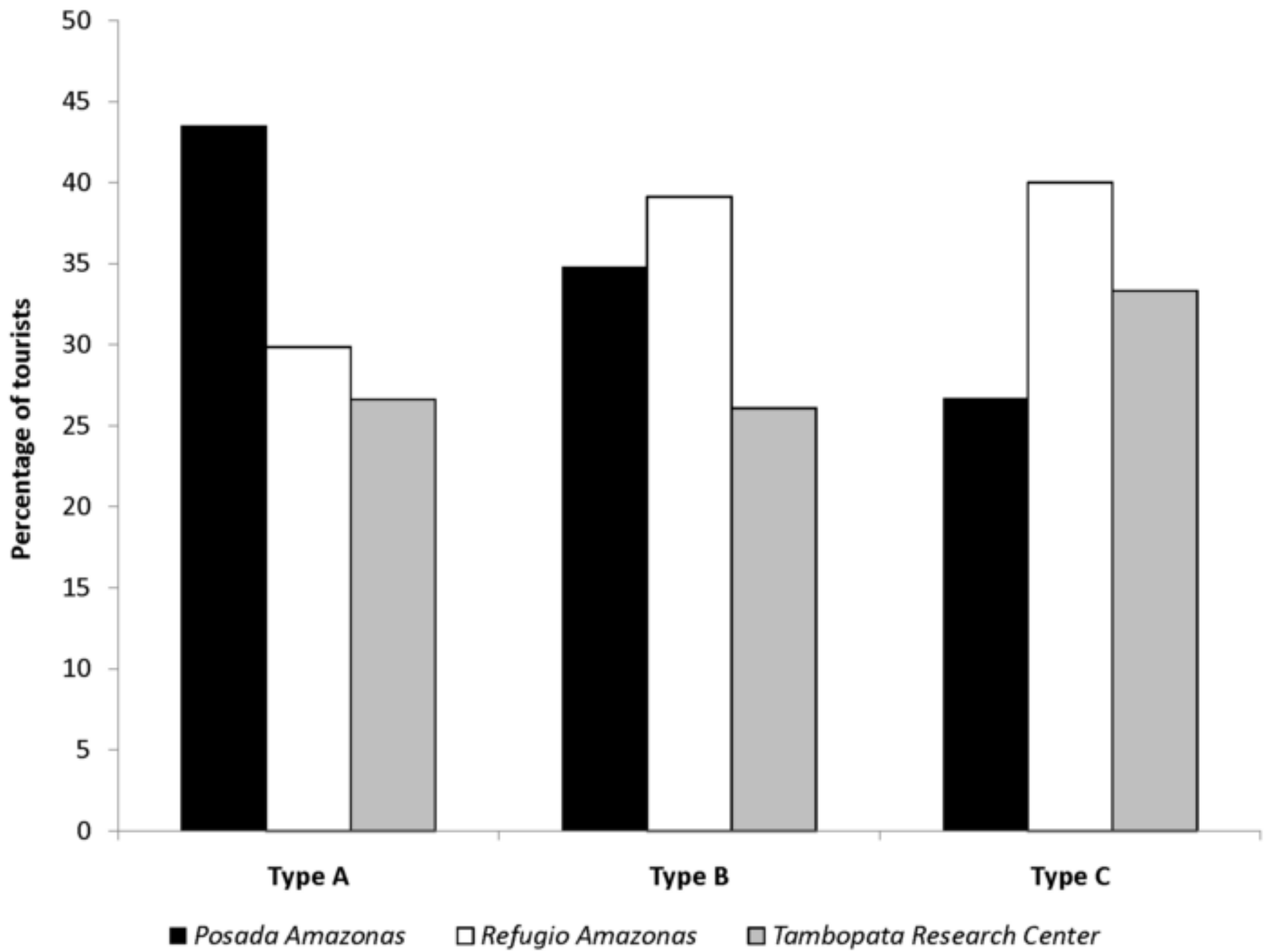**Click here to download high resolution image**

Figure 3
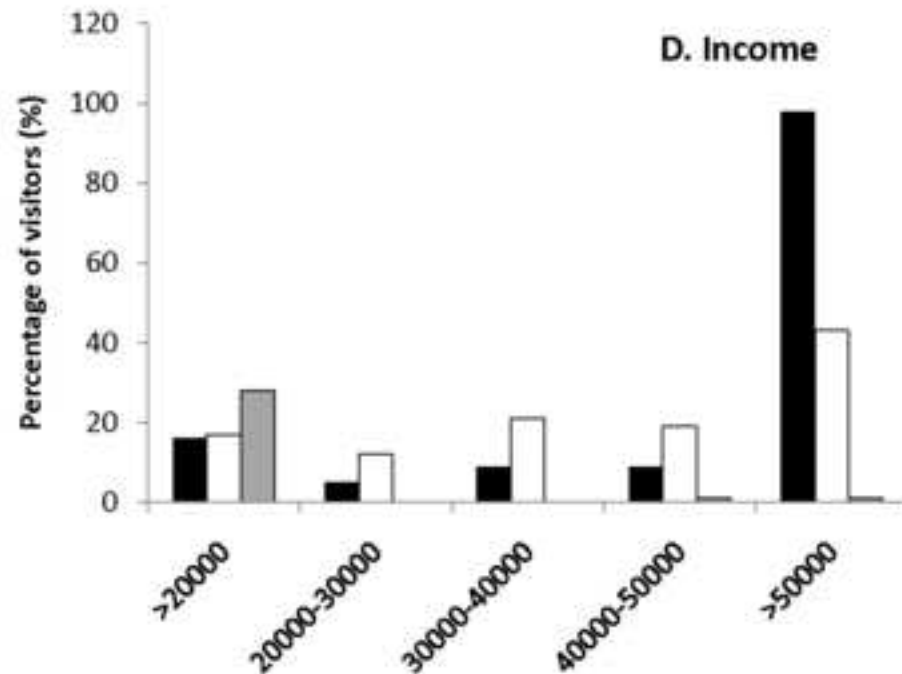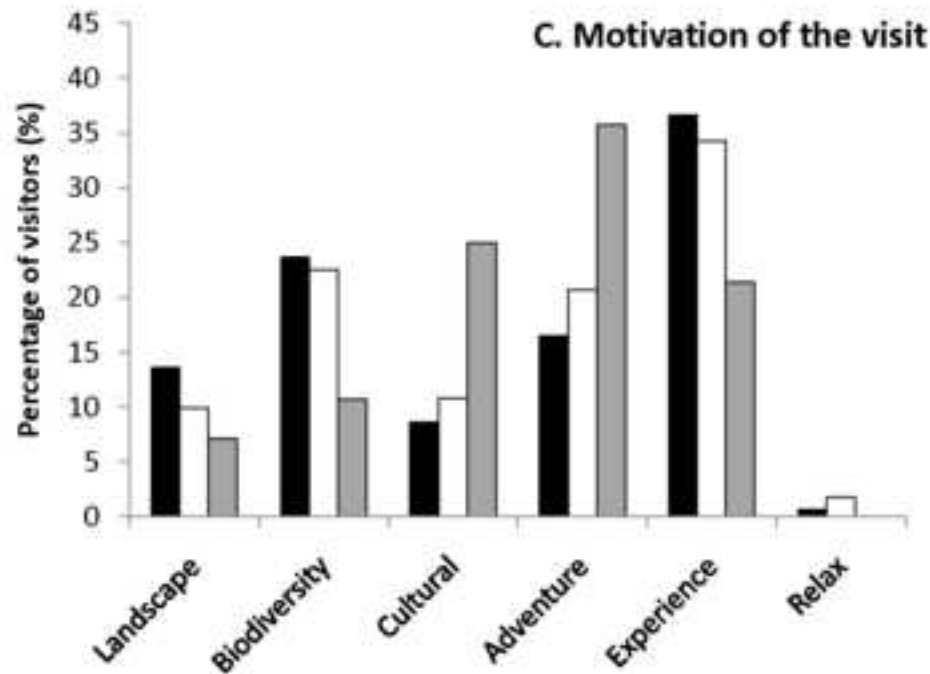
Table1

Table 1
Summary of the variables used in the analysis, their main attributes, and the data source.

Variables		Type	Attributes	Data sources
Dependent	Overall satisfaction	Ordinal	Satisfaction level between 1-7	Tourists' questionnaires
Independent	**Socio-economic aspects**			
	Nationality	Categorical	Categories: North America (USA and Canada), Europe, Latin America, Asia and Oceania.	Tourists' questionnaires
	Profession	Categorical	Categories: Health sector, Education s., Legal s., Economy s., Retired, Housewife, Sciences, Engineering, Technical, Others	Tourists' questionnaires
	Age	Quantitative	Years	Tourists' questionnaires
	Education level	Categorical	School (1), University (2), Postgraduate (3).	Tourists' questionnaires
	Income	Ordinal	In US$: <20 000 (1), 20 000-30 000 (2), 30 000-40 000 (3), 40 000-50 000 (4), >50 000 (5)	Tourists' questionnaires
	Environmental and visit attitudes			
	Belonging to an environmental NGO	Dichotomous	Yes (1), No (0)	Tourists' questionnaires
	Previous visits to natural protected areas	Dichotomous	Yes (1), No (0)	Tourists' questionnaires
	Previous visits to tropical rainforests	Dichotomous	Yes (1), No (0)	Tourists' questionnaires
	Major motivation of the visits	Ordinal	In order of preference, with a maximal value of 6 and a minimal value of 1: landscape, biodiversity, cultural, experience, adventure, relaxation	Tourists' questionnaires
	Number of companions	Ordinal	Alone=1, couple=2, family=3, friends or group=4	Tourists' questionnaires
	Lodge characteristics			
	Lodge and logistic quality	Ordinal	Satisfaction level between 1-7	Tourists' questionnaires
	Lodge managed by a native community	Dichotomous	Yes (1), No (0)	Direct observation
	Guide characteristics			
	Guide's quality	Ordinal	Calculated index based on the enterprise's evaluation and ranking provided by the enterprise.	Direct question to the enterprise.

Guide's origin	Dichotomous	Native and non-native guide; local or not.	Information provided by the enterprise.
Activity characteristics			
Group size	Quantitative	Number of persons conducting the activity	Direct observation
Activity time length	Quantitative	Grouped in the categories; less than two hours = 1, between two and four =2, more than four hours =3	Direct observation
Activity distance	Quantitative	Distance in kilometres walked, grouped in: < 2 km (1), between 2 and 4 km (2), >4 km (3)	Direct observation
Weather conditions	Dichotomous	Presence of a weather incident during the activity: Yes (1), No (0)	Direct observation
Activity types	Categorical	Terrestrial, aquatic, cultural, nocturnal, collpa and tower activity	Direct observation
Ecological characteristics			
Forest successional state	Categorical	Pristine (1), Secondary (2), Agroforestal (3), Pioneer (4).	Direct observation
Number of species observed more than 25 m away [a]	Quantitative	Mammals, birds, herpetofauna and entomofauna index.	Direct observation
Number of species observed less than 25 m away [a]	Quantitative	Mammals, birds, herpetofauna and entomofauna index.	Direct observation
Number of charismatic species observed	Quantitative	Number of birds (psittacids and representative birds), mammals (primates, cats, peccaries and giant river otters), herpetofauna, (large reptiles), and entomofauna	Direct observation

[a] To analyse these variables, we developed an "index of observed fauna", separately for mammals, birds, herpetofauna and entomofauna. This index was calculated as the sum of the number of charismatic species observed and given the value of 1 for those observed closer than 25 m and 0.5 for those observed farther away.

Table2

Table 2
Different variables influencing satisfaction level of the three tourist typologies.

	TYPE A		TYPE B		TYPE C	
Explanatory variable	**Mean**	**Statistical**	**Mean**	**Statistical**	**Mean**	**Statistical**
Lodge and logistic quality	5.79	$r_s= 0.384$***	6.06	$r_s= 0.275$***	5.76	$r_s = 0.553$***
Lodge managed by a Native Community	1=5.25, 0=5.70	$U= 2065.5$**	1=5.29, 0=5.93	$U= 1335.0$	1=5.00, 0=5.50	$U= 73.0$
Guide's quality	6.72	$r_s= 0.004$	6.65	$r_s = 0.011$	6.71	$r_s = 0.006$
Native guide	1=5.56, 0=5.56	$U= 1186.5$	1=6.63, 0=5.81	$U= 1116.0$***	1=5.00, 0=5.48	$U= 70.0$
Local guide	1=5.54, 0=5.59	$U= 2600.5$	1=6.09, 0=5.94	$U= 1635.5$	1=5.47, 0=5.42	$U= 98.0$
Length of the activity in hours	<2=5.72, 2-4=5.53, >4=5.54	$\chi^2= 5.991$	<2=5.63, 2-4=6.00, >4=6.31	$\chi^2= 5.991$	<2=5.40, 2-4=5.33, >4=5.43	$\chi^2= 5.991$
Distance of the activity in km	<2= 5.33, 2-4=6.15, >4=5.56	$\chi^2= 5.991$***	<2=5.83, 2-4=5.94, >4=6.31	$\chi^2= 5.991$	<2=5.60, 2-4=4.20, >4=5.60	$\chi^2= 5.991$
Weather conditions	1=5.19, 0=5.64	$U= 1620.5$	1=5.96, 0=5.92	$U= 1165.0$	1=7.00, 0=5.19	$U= 9.0$**
Cultural activity	1=4.91,	$U= 1359.5$***	1=6.05,	$U= 922.0$	1=5.00,	$U= 65.5$

1

	0=5.76		0=5.90		0=5.46	
Aquatic activity	1=5.56,	$U= 1499.0$	1=6.31,	$U= 626.0$	1=5.60,	$U= 60.5$
	0=5.56		0=5.87		0=5.32	
Tower activity	1=5.73,	$U= 868.5$	1=5.89,	$U= 1226.0$	1=6.00,	$U= 41.0$
	0=5.54		0=5.94		0=5.27	
Collpa activity	1=5.52,	$U= 2051.5$	1=5.84,	$U= 1045.0$	1=6.43,	$U= 39.0**$
	0=5.57		0=5.95		0=5.04	
Terrestrial activity	1=6.23,	$U= 1060.0***$	1=6.05,	$U= 730.0**$	1=4.43,	$U= 116.0*$
	0=5.38		0=5.90		0=5.65	
Nocturnal activity	1=5.71,	$U= 486.5$	1=5.00,	$U= 664.0**$	1=3.00,	$U= 27.0$
	0=5.55		0=6.01		0=5.45	
Pristine forest	1=5.89,	$U= 1564.0**$	1=6.04,	$U= 905.0*$	1=5.44,	$U= 81.5$
	0=5.44		0=5.89		0=5.33	
Secondary forest	1=5.47,	$U= 2242.5$	1=5.85,	$U= 1288.0$	1=5.18,	$U= 91.5$
	0=5.70		0=6.04		0=5.57	
Agroforestal forest	1=5.06,	$U= 1411.0**$	1=5.88,	$U= 890.0$	1=6.00,	$U= 40.0$
	0=5.63		0=5.94		0=5.27	
Pioneer forest	1=7.00,	$U= 58.5**$	1=7.00,	$U= 54.0**$	1=5.00,	$U= 19.0$
	0=5.53		0=5.90		0=5.45	
Mammal index	0.11	$r_s= 0.001$	0.09	$r_s= 0.040**$	0.13	$r_s= 0.020$
Bird index	0.24	$r_s= 0.009$	0.25	$r_s= 0.051**$	0.25	$r_s= 0.008$

Herpetofauna index	0.04	$r_s= 0.001$	0.04	$r_s= 0.002$	0.02	$r_s= 0.073$
Entomofauna index	0.01	$r_s= 0.001$	0.00	$r_s= 0.001$	-	-

*p<0.1, **p<0.05, ***p<0.0

Table3

Table 3
Results of the Principal Component Analysis (PCA)

Variables	Factor scores			Squared cosine		
	F1	F2	F3	F1	F2	F3
Lodge and logistic quality	0.310	0.179	0.929	0.094	0.031	0.850
Lodge managed by a native community	-0.183	-0.262	0.005	0.141	0.289	0.000
Guide's quality	-0.545	0.816	-0.001	0.282	0.631	0.000
Native guide	-0.094	0.037	0.014	0.070	0.011	0.002
Local guide	0.010	-0.126	-0.010	0.000	0.064	0.000
Group size	-0.650	-0.344	0.308	0.426	0.120	0.096
Activity time length	-0.247	0.100	-0.007	0.415	0.068	0.000
Activity distance	0.854	0.100	-0.065	0.736	0.010	0.004
Weather conditions	0.018	-0.049	0.002	0.002	0.015	0.000
Cultural activity	-0.200	-0.006	0.008	0.232	0.000	0.000
Aquatic activity	0.265	-0.095	-0.004	0.500	0.064	0.000
Tower activity	-0.054	-0.107	0.007	0.021	0.083	0.000
Collpa activity	-0.072	-0.066	0.023	0.032	0.027	0.003
Terrestrial activity	0.071	0.249	-0.023	0.030	0.367	0.003
Nocturnal activity	-0.010	0.024	-0.012	0.004	0.021	0.005
Forest succession	-0.191	-0.318	0.136	0.074	0.204	0.037
Mammal index	0.077	0.023	-0.014	0.195	0.018	0.006
Bird index	0.089	-0.048	0.011	0.158	0.045	0.003
Herpetofauna index	0.005	0.013	0.002	0.003	0.017	0.000
Eigenvalue	1.822	1.116	0.984			
% variance explained	28.590	17.509	15.431			
Accumulated % variance explained	28.590	46.099	61.530			

Table4

Table 4
Multivariate regression model for tourists' *overall satisfaction*

Variable	Coefficient	Standard deviation	*T ratio*	*p*-value
Constant	-0.099	0.133	-0.746	0.456
F1	0.155	0.032	4.830	< 0.001
F2	0.137	0.041	3.356	0.001
F3	0.660	0.044	15.098	< 0.001
Type-A	0.075	0.146	0.514	0.608
Type-B	0.278	0.150	1.854	0.065
N	320			
R^2	0.509			
Adjusted R^2	0.500			
F	55.586			
p-value	< 0.001			

Appendix 1. Questionnaire administered to individual ecotourists after the tour.

1. Nationality_____

2. Occupation / Profession _____

3. Higher education ( ) University ( ) Postgraduate ( )

4. Annual income US$ < 20000 ( ), 20000-30000 ( ), 30000-40000 ( ), 40000-50000 ( ), >50000 ( ).

5. Do you belong to any conservation organisation such as WWF, CI, ABC, etc? Yes ( ) No ( ).

6. Did you travel Alone ( ), With a partner ( ), Number of relatives___ ( ), Size of group (how many people?)_____

7. Have you previously visited a protected area? Yes ( ) No ( )

8. Have you previously visited a tropical forest? Yes ( ) No ( ) How many times?_____.

9. What were the main reasons for your visit? Please give reasons in order with number 1 being the most important reason and 5 the least important. Landscape ( ), Biodiversity ( ), Cultural ( ), Adventure ( ), Experience ( ), Relaxation ( ).

10. On a scale of 1 to 7, with 7 being the maximum value, how satisfied were you with the logistics and accommodation during your trip? 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) 6 ( ) 7 ( ).

11. On a scale of 1 to 7, with 7 being the maximum value, how satisfied were you with the route/path that was just taken? 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) 6 ( ) 7 ( ).