

Beyond the “General Public”: Implications of Audience Characteristics for Promoting Species Conservation in the Western Ghats Hotspot, India

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Abstract Understanding how different audience groups perceive wildlife is crucial for the promotion of biodiversity conservation, especially given the key role of flagship species in conservation campaigns. Although the heterogeneity in preferences reinforces the need for campaigns tailored to specific target audiences, many conservation education and awareness campaigns still claim to target the “general public”. Audiences can be segmented according to social, economic, and cultural criteria across which species perceptions are known to vary. Different studies have investigated the preferences of different groups towards certain wildlife species, but these are largely confined to a single conservation stakeholder group, such as tourists, local communities, or potential donors in western countries. In this study, we seek to determine from a multi-stakeholder perspective, audience characteristics that influence perceptions towards wildlife at Valparai, a fragmented plateau in the Western Ghats region of the Western Ghats-Sri Lanka Hotspot. We found that stakeholder group membership was the most important characteristic followed by gender. While some characteristics had a wide-scale effect others were restricted to a few species. Our results emphasize the need to design conservation campaigns with specific audiences in mind, instead of the very often referred to “general public”.

Keywords Community-based conservation · Flagship species · India · Stakeholder · Species perceptions · Valparai

INTRODUCTION

Wildlife conservation is crucially linked to the support it receives from people (Western 2001; Bremner and Park

2007). In order to effectively garner such support through public campaigns, be it in terms of fundraising (Walpole and Leader-Williams 2002) or behavior change, human attitudes towards wildlife need to be understood. However, people tend to be very different from one another as they are influenced by numerous dimensions like economic conditions, lifestyle, and social norms (Schultz 2011) which in turn makes human behavior a complex phenomenon. However, conservationists often assemble everyone into the “general public” category (Fischer and Young 2007; Lindemann-Matthies and Bose 2008; Schultz 2011) when launching conservation campaigns. For example, Spash and Hanley (1995) found that the general public understood the meaning of biodiversity less than students and concluded that this result “raises concern over consulting the public for their valuations of biodiversity”. This conclusion is, however, less informative as it does not take into consideration the heterogeneity within the so-called general public especially in terms of education, occupations, or interest in wildlife. This limits our ability to tackle any identified issue in a cost-effective manner as it suggests that a very wide group should be targeted when it is likely that particular segments within the audience are much more relevant than others.

Attitude towards wildlife are influenced by “a combination of functional, consumptive and cultural dimensions” (Kaltenborn et al. 2006). For example, gender and level of education have been shown to influence the attitude of local communities in Tanzania towards wildlife, with men and those most highly educated showing higher appreciation for wildlife (Kaltenborn et al. 2006). Tourists with different motives for visiting the Doñana Natural Protected Area in Spain were found to differ in their perceptions of ecosystem services provided by the area and its biodiversity (Martin-Lopez et al. 2007a). While pilgrims

considered religious and provisioning services as important, environment professionals considered scientific and educational services (Martin-Lopez et al. 2007a). Men, older people, those with full-time employment and those who had prior knowledge of eradication projects were more likely to support control measures towards the management of invasive non-native species in Scotland (Bremner and Park 2007). However, one caveat of these existing studies is that they look at one or a few factors at a time, be it stakeholder type, demographic group, or socio-economic group. This makes overall comparisons between respondent characteristics difficult and does not allow for a more in-depth understanding of what are the most important social, economic, and cultural factors that influence perceptions towards wildlife.

Our objective is to document heterogeneity of attitudes towards different species at the local scale with respect to people's socio-economic characteristics to make a case for the need for a more targeted approach to conservation campaigns. We set out to determine such attitudes in India, a diverse country whose biodiversity, high human population density, multi-cultural diversity, intensive land-use, and the presence of numerous stakeholders whose livelihoods influence biodiversity, provide an ideal case for such a study.

MATERIALS AND METHODS

Study Location

This study was conducted at Valparai, (N 10°22', E 76°58'), a Municipality in the Anamalai Hills of the Western Ghats region, part of the Western Ghats-Sri Lanka Hotspot, near the border between the southern Indian States of Tamil Nadu and Kerala. Surrounded by the Anamalai Tiger Reserve, Valparai has a highly fragmented landscape characterized by numerous tea, coffee, cardamom, and eucalyptus plantations interspersed with rainforest fragments (Kapoor 2008). These rainforest fragments support a rich biodiversity including many species of conservation concern (Raman 2006; Sridhar et al. 2008). Human-wildlife conflict, especially with Asian elephants (*Elephas maximus*) and leopards (*Panthera pardus*), occurs at a low frequency but has a pronounced social impact (Kumar 2006). The human population of Valparai, is estimated at ~95 107 individuals (DCO-TN 2001), a large proportion of whom work in plantations (Raman 2006). As a consequence, households are generally situated in close proximity to plantations. The human population here is represented by the three major religions of India—Hinduism, Islam, and Christianity, and the common local languages spoken are Tamil and Malayalam.

Survey Instrument Design

We started by selecting 18 species (Table 1: eight mammals, four birds, two reptiles, two amphibians, a freshwater fish, and a butterfly), known to occur in the Anamalai Hills as to represent a wide range of taxonomic groups, physical appearances, IUCN threat status and local cultural values (Ali 2002; Daniel 2002; Prater 2005; Kehimkar 2008; Raghavan et al. 2011). Higher taxonomic groups had greater representation as the species belonging to them are generally more easily recognized and differentiated by the local population given their larger body size.

A questionnaire to assess respondents' attitudes towards different species was then developed which presented each respondent with color photographs of a randomly selected subset of six of the above-mentioned species. Respondents were then asked to rate each species on a five-point likert-scale ("strongly like", "like", "neutral", "dislike", or "strongly dislike"). The number of images was selected bearing in mind the potential cognitive burden laid upon the respondent, which increases with the number of species to be classified. All images were standardized for photograph quality and species behavior and no other information was presented with the photographs, although common species names were given when respondents asked for clarification. Audience characteristics in the form of stakeholder group, age, gender, religion, education, occupation, income, geographical origin, and distance of household from forested areas were also collected (Table 2). A pilot survey was undertaken at Valparai to pre-test the model questionnaire, which was continued without any revisions since errors did not emerge.

The questionnaire was delivered face to face. Systematic sampling strategy (Newing 2010) was used to select local individuals residing around 12 forest fragments (Fig. 1). Targeted sampling was used in case of conservation practitioners and the questionnaires were administered at their respective offices or field stations. Opportunistic sampling was undertaken to interview tourists over a period of 3 days at the largest hotel in Valparai. One hundred and sixty questionnaires were completed of which three were rejected as they were incomplete. A total of 157 questionnaires (92 local individuals, 45 tourists, 20 conservation practitioners) were used for the analysis.

Analysis

The responses were assigned codes from one to five, corresponding to the manner the respondent rated them (1 being "strongly dislike" and 5 being "strongly like") (Newing 2010). Using SPSS 9.1, ordinal regression was carried out to determine the extent of influence of the

Table 1 Results of Kruskal–Wallis and Mann–Whitney *U* tests to determine stakeholder characteristics that influence species appreciation

	Stakeholder group ^a	Age ^a	Gender ^b	Religion ^a	Education ^a	Income ^a	Geographic origin ^b	Distance from forest ^a
Lion-tailed macaque (<i>Macaca silenus</i>)	6.01*	4.37	2.49*	1.75	0.51	5.73	−0.70	1.61
Tiger (<i>Panthera tigris</i>)	28.38***	0.15	0.91	3.30	11.49**	15.62**	−1.30	15.07***
Nilgiri tahr (<i>Nilgiritragus hylocrius</i>)	3.75	5.71	1.04	1.65	1.19	9.03*	0	0.71
Asian elephant (<i>Elephas maximus</i>)	25.14***	1.11	0.14	5.49	5.73	8.05*	−0.10	14.03***
Wild boar (<i>Sus scrofa</i>)	4.15	0.68	0.01	7.24	3.78	1.71	−1.15	3.94
Spotted deer (<i>Axis axis</i>)	1.92	0.48	0.48	1.37*	2.96	3.98	−1.17	4.49
Slender loris (<i>Loris lydekkerianus</i>)	10.43**	1.80	1.28	0.70	4.00	10.66*	−0.95	2.76
Nilgiri marten (<i>Marten gwatkinsii</i>)	5.27	2.41	1.08	2.49	2.25	6.58	−0.81	0.73
Wayanad laughing thrush (<i>Garrulax delesserti</i>)	2.01	6.08	0.75	0.32	1.51	4.32	−0.81	2.65
Great hornbill (<i>Buceros bicornis</i>)	5.34	3.18	1.58	3.71	5.20	3.58	−0.86	0.32
Indian peafowl (<i>Pavo cristatus</i>)	1.37	1.24	1.16	1.32	12.19**	7.35	−0.16	2.81
Bristled grassbird (<i>Chaetornis striata</i>)	0.17	4.87	0.33	0.40	2.13	0.76	−0.42	0.12
King cobra (<i>Ophiophagus hannah</i>)	14.58***	0.75	2.28*	0.85	3.84	5.76	−2.21*	3.29
Travancore tortoise (<i>Indotestudo travancorica</i>)	14.74***	2.28	1.14	1.28	11.08*	8.59*	−0.71	4.79
Indian toad (<i>Duttaphrynus melanostictus</i>)	3.72	0.79	0.92	1.02	3.35	6.34	−1.33	0.51
Parachuting frog (<i>Rhacophorus pseudomalabaricus</i>)	5.58	1.65	0.32	0.31	2.46	1.44	−0.38	1.98
Deccan mahseer (<i>Tor khudree</i>)	0.001	0.60	1.08	0.43	0.84	0.45	−0.23	0.14
Southern birdwing (<i>Troides minos</i>)	0.21	0.85	0.53	0.56	2.11	2.70	−0.95	2.70

^a Kruskal–Wallis test, ^b Mann–Whitney *U* test; significance levels are indicated by asterisks (* $P < 0.05$, ** $P < 0.01$, *** $P \leq 0.001$)

Table 2 Description of audience characteristics collected

Audience characteristic	Description and grouping
Stakeholder group	Local community, tourist, conservation practitioner (forest department official and conservation researcher)
Age	Respondent’s age in years. Further grouped under four categories: 18–30, 31–40, 41–50, above 50
Gender	Male or female
Religion	The religion the respondent currently followed or born into: Hindu, Muslim, Christian, Buddhist
Education	Highest educational level attained: no education, elementary (1st–8th standard), secondary (9th–12th standard), graduate (above 12th)
Occupation	Occupation of the respondent including whether he/she was retired or a housewife
Income	Monthly income in US\$. Grouped under: \$0, \$1–\$55, \$56–\$110, above \$110. Conversion rate: 1US\$ = INR 45.4
Geographic origin	The place from which the respondent originated. Grouped under: Tamil Nadu, Kerala, other states in India, foreign national
Distance from forested areas	Distance of respondents’ household from forest areas. Grouped as “close to”, “far away”, and “very far away” from forested areas

various audience characteristics on species appreciation. Non-parametric tests, Kruskal–Wallis, and Mann–Whitney *U* tests were used to explore the differences in species

appreciation within each audience characteristic. Spearman’s rank correlation was undertaken to test for any correlations between the audience characteristics.

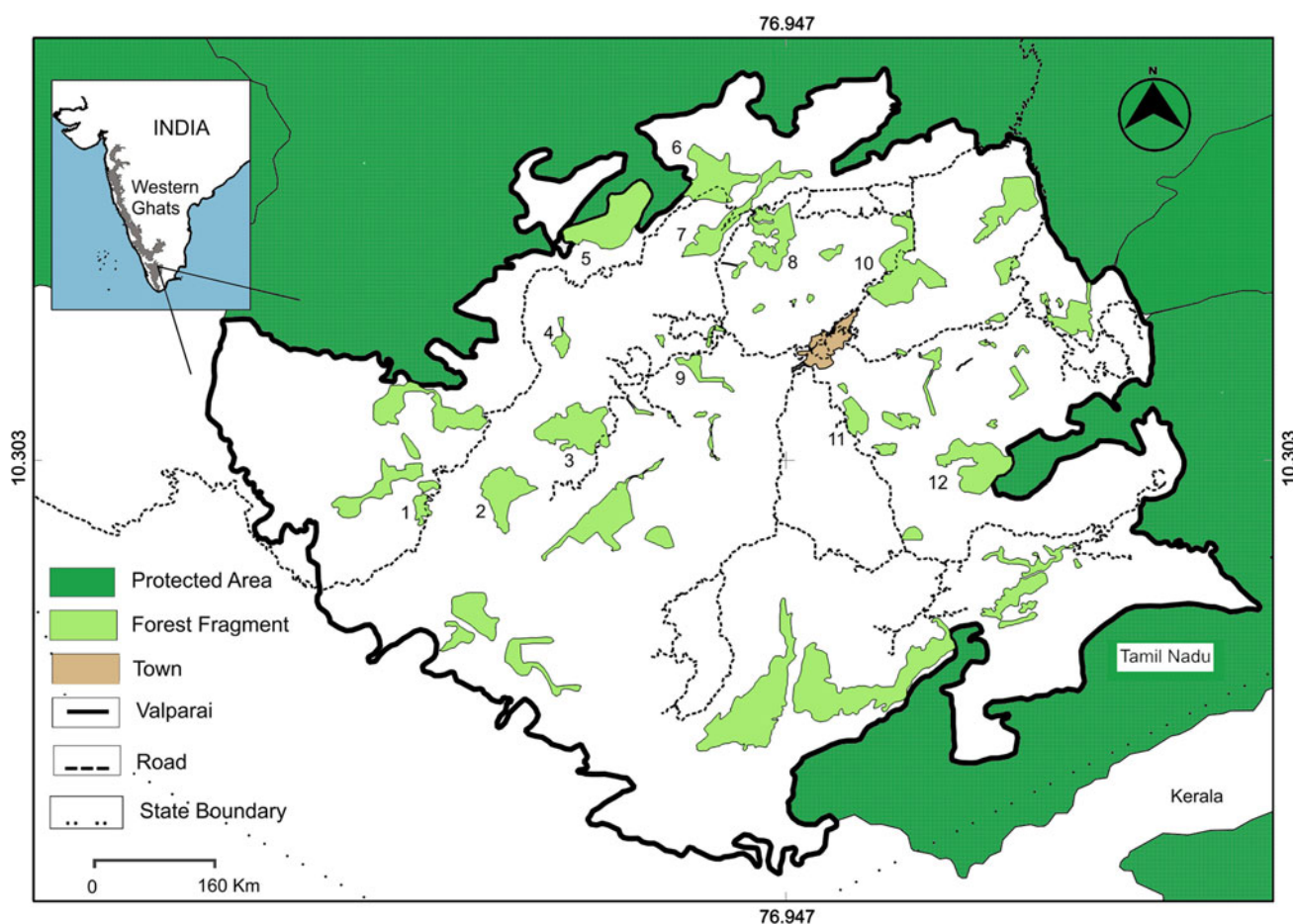


Fig. 1 Map of the study area and its location in the Western Ghats of southern India. The landscape matrix of forest fragments and plantations, town area, contiguous protected areas, state boundaries, and road network encompassing Valparai are shown. Local community surveys were conducted in settlements close to the forest fragments: 1 Sholayur Dam, 2 Pannimede, 3 Korangmudi, 4 Urlikkal, 5 Surlimalai, 6 Varrattuparai, 7 Old Valparai, 8 Sellaliparai, 9 Injipara, 10 Puthuthotam, 11 Srikundra, and 12 Tantea. Surveys with tourists, forest department officials, and conservation researchers were conducted in Valparai town. Study sites were digitized using LISS III data and other shape files obtained from the India Biodiversity Portal <http://indiabiodiversity.org> and VDS Technologies http://www.vdstech.com/map_data.htm

RESULTS

Overall, the Indian peafowl (*Pavo cristatus*), Great Hornbill (*Buceros bicornis*), and lion-tailed macaque (*Macaca silenus*) were the most-liked species while the wild boar (*Sus scrofa*), Indian toad (*Duttaphrynus melanostictus*), Travancore tortoise (*Indotestudo travancorica*), king cobra (*Ophiophagus hannah*), and slender loris (*Loris lydekkerianus*) were the least-liked (Fig. 2).

Overall Influence of Audience Characteristics in Species Perception

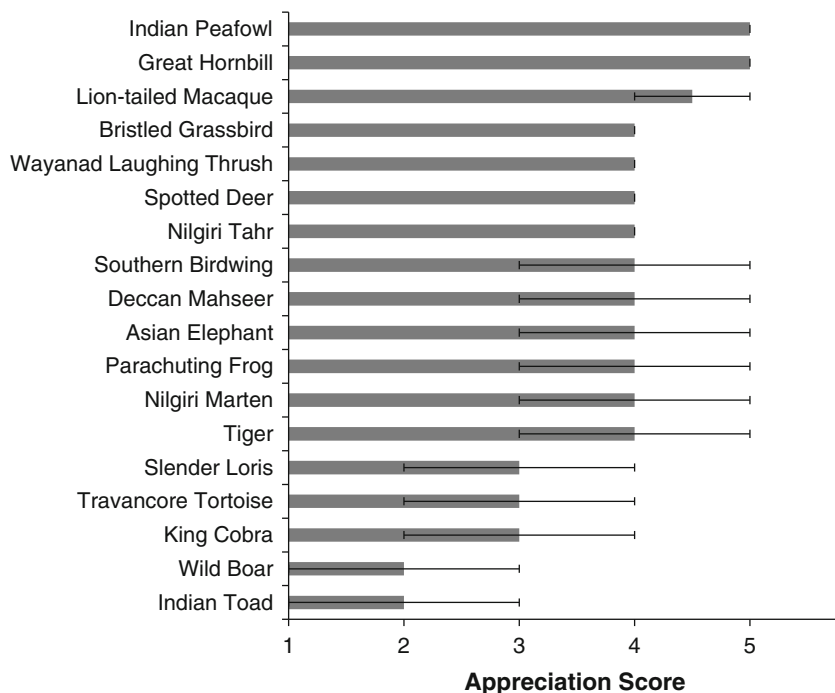
Stakeholder group was the variable that influenced species perceptions most, followed by gender (Table 3). There were significant correlations between the audience characteristics (Table 4).

Species Perceptions by Audience Characteristics

Stakeholder Group

The sample largely comprised local communities (58.5 %), the rest being tourists (28.7 %) and conservation practitioners (12.8 %). There were differences in perception between the three stakeholder groups for six of the target species (Table 1). There was a strong appreciation for the tiger (*Panthera tigris*) and Asian elephant (*Elephas maximus*), two widely used flagships, among tourists (5 ± 0 and 4.5 ± 0.5 , respectively) and conservation practitioners (5 ± 0 and 5 ± 0 , respectively). This however, decreased drastically among the local community towards the tiger (2 ± 1.0) but was still, largely positive towards the elephant (4 ± 0.5). The lion-tailed macaque was highly appreciated by conservation practitioners (5 ± 0) while

Fig. 2 Median species appreciation by the entire sample (1 = strongly dislike, 3 = neutral, 5 = strongly like)



local communities and tourists appreciated them a little lesser (4 ± 1 and 4 ± 1 , respectively). The slender loris, Travancore tortoise, and king cobra were less appreciated by the local community (2 ± 0 , 2 ± 1.0 , and 2 ± 1.0 , respectively) but highly regarded by conservation practitioners (4 ± 1.0 , 5 ± 0 , and 5 ± 0) and received considerable positive appreciation from tourists (3.5 ± 0.5 , 4 ± 1.0 , and 3 ± 1.0 , respectively).

Age

The sample comprised 33.1 % respondents between 18 and 30 years, 26.8 % between 31 and 40, 22.3 % between 41 and 50, and 17.8 % above 50 years. There were no differences between age groups in their appreciation towards any of the species investigated (Table 1).

Gender

The sample comprised 77 % males and 23 % females. There were differences between male and female respondents in their perception of the lion-tailed macaque and king cobra (Table 1). Male respondents positively appreciated lion-tailed macaques (5 ± 0) while female respondents (3 ± 0.5) regarded them with neutral appreciation. The king cobra was disliked by female respondents (2 ± 0.5) and neutrally appreciated by male respondents (3.5 ± 1.5).

Religion

Hindus comprised 70.1 % of the sample, Christians 15.9 %, Muslims 12.7 %, and Buddhists 0.6 %. Differences in respondent appreciation occurred only towards the spotted deer (Table 1), with Muslim respondents (5 ± 0) favoring the species over Hindus (4 ± 0), and Christians (4 ± 1.0).

Education

Within the sample, 4.5 % did not have any formal education, 27.4 % had primary education, 33.8 % had secondary education and 34.4 % were graduates. Differences in perceptions between education groups occurred towards the tiger, Indian peafowl, and Travancore tortoise (Table 1). For the Travancore tortoise, respondents who had no formal education strongly disliked this species (1.5 ± 0.5) but as education level grew from primary (2 ± 1.0) and secondary (3 ± 1.0) to graduate (3.5 ± 1.5), species appreciation grew markedly, up to positive appreciation. Similarly for the tiger, respondents with no formal education (2 ± 1.0) disliked the tiger but appreciation increased with the level of education (primary = 3 ± 1.0 , secondary = 4 ± 1.0 , graduate = 5 ± 0). For the Indian peafowl too, respondents with no formal education (4 ± 0) liked the species lesser than the other groups who strongly liked it (primary = 5 ± 0 , secondary = 5 ± 0 , graduate = 5 ± 0).

Table 3 Ordinal regression of relationships between audience characteristics and their species appreciation scores (Model $\chi^2 = 84.8$, $df = 8$, $P < 0.0001$, $-2 \log \text{likelihood} = 1160.9$; Pseudo R^2 (Nagelkerke) = 0.091)

	Estimate	Std. error	Wald	df	<i>P</i> (Sig.)
<i>Threshold</i>					
[Code 1]	-1.977	0.375	27.795	1	0.000
[Code 2]	-0.277	0.357	0.601	1	0.438
[Code 3]	0.305	0.357	0.733	1	0.392
[Code 4]	1.990	0.363	30.008	1	0.000
<i>Audience characteristics</i>					
Age	0.065	0.065	0.999	1	0.318
Gender	-0.430	0.149	8.272	1	0.004
Religion	0.123	0.090	1.891	1	0.169
Income	-0.012	0.038	0.093	1	0.760
Education	0.069	0.050	1.931	1	0.165
Geographic origin	0.059	0.106	0.307	1	0.579
Stakeholder group	0.693	0.114	37.034	1	0.000
Distance from forested areas	-0.092	0.088	1.087	1	0.297

Table 4 Spearman's rank correlation values between the audience characteristics ($P < 0.05^*$, $P < 0.01^{**}$, $n = 157$)

Audience characteristic	Age	Gender	Religion	Income	Education	Geographical origin	Stakeholder group	Distance from forest areas
Age	1							
Gender	-0.158*	1						
Religion	0.039	0.061	1					
Income	0.130	-0.291**	-0.083	1				
Education	-0.482**	-0.006	-0.035	0.235**	1			
Geographical origin	-0.116	0.100	0.376**	0.070	0.215**	1		
Stakeholder group	-0.246**	-0.082	-0.048	0.386**	0.578**	0.194*	1	
Distance from forest areas	-0.328**	0.037	0.048	0.056	0.518**	0.139	0.475**	1

Income

The monthly income for 26.1 % of the respondents was \$1–\$55, 28 % earned \$56–\$110, and 29.3 % earned above \$110 while the rest did not earn an income as they had either retired or were housewives. There were perception differences between income groups towards the tiger, Asian elephant, Nilgiri tahr (*Nilgiritragus hylocrius*), slender loris, and Travancore tortoise (Table 1). Respondents with no income (4.5 ± 0.5) or those who earned above \$110 (5 ± 0) preferred the tiger to the two other income groups ($\$1$ – $\$55 = 3 \pm 1.0$, $\$56$ – $\$110 = 2.5 \pm 1.0$), who were neutral towards the species. With increasing monthly salary, respondents' dislike towards the slender loris decreased and the highest income group (above \$110 = 4 ± 1.0) positively appreciated the species ($\$0 = 2 \pm 0$, $\$1$ – $\$55 = 2 \pm 0$, $\$56$ – $\$110 = 4 \pm 0$). Similarly, the positive appreciation towards the Asian elephant increased with increasing income ($\$0 = 4 \pm 1.0$, $\$1$ – $\$55 = 4 \pm 1.0$, $\$56$ – $\$110 = 4 \pm 0$, above \$110 = 5 ± 0).

Positive appreciation for the Nilgiri tahr increased overall with income ($\$0 = 4 \pm 0$, $\$1$ – $\$55 = 4 \pm 1$, $\$56$ – $\$110 = 4 \pm 0$, above \$110 = 4 ± 1). The Travancore tortoise was disliked by the groups earning \$1 to \$55 (2 ± 0), neutrally appreciated by the other higher earning groups ($\$56$ – $\$110 = 3 \pm 1.0$, above \$110 = 3 ± 1.0) but positively appreciated by those with no income (4 ± 1.0).

Geographic Origin

Respondents who originated from the state of Tamil Nadu comprised 79 % of the sample, 15.3 % were from the state of Kerala, 3.2 % were from other states within India, and 2.5 % were nationals of other countries. The king cobra alone registered differences in perception between respondents (Table 1), with neutral appreciation from those from Tamil Nadu (3.5 ± 1.5), negative appreciation from Kerala (2 ± 1.0) and foreign countries (1 ± 0) and positive appreciation from the other Indian states (5 ± 0).

Distance from Forested Areas

A majority (49.7 %) of the respondents lived close to forested areas, 21.65 % lived slightly far but in the same landscape while 28.65 % lived far from forested areas. There were perception differences towards the tiger and elephant between the groups, living at different distances from forested areas (Table 1). As the distance from forest areas increased, positive appreciation towards them increased (tiger: close to forest areas = 3 ± 1.0 , far away = 2 ± 1.0 , very far away = 5 ± 0 ; elephant: close to forest areas = 4 ± 1.0 , far away = 4 ± 1.0 , very far away = 4.5 ± 0.5).

DISCUSSION

Overall, the tiger and elephant, two of the most widely used conservation flagship species, were placed lower in the preference ranking (Fig. 2) probably as a result of human–wildlife conflicts (Kumar 2006). The relatively high score received by the elephant even though it was involved in human–wildlife conflicts suggests that the cultural and religious ties associated with the species allows for continued positive appreciation. As expected, species that are often considered less aesthetically attractive (toad, wild boar), perceived as bad omens (slender loris: Kanagavel et al. 2013; Travancore tortoise: Kumara 2007) and/or as a threat (king cobra; see Kaltenborn et al. 2006) feature lower in the ranking (Fig. 2). On the other hand, the high overall ranking of the southern birdwing, the largest south Indian butterfly, Parachuting frog and the Deccan mahseer, an endangered freshwater fish (Fig. 2) reinforce the notion that usually neglected taxonomic groups (Clucas et al. 2008) can be used as conservation flagships (New 2008; Guiney and Oberhauser 2009). This large heterogeneity also means that conservation campaigns involving flagship species should be developed with a specific target stakeholder in mind so as to ensure effectiveness (Verissimo et al. 2011).

Overall Influence of Audience Characteristics in Species Attitude

Overall, stakeholder group had the greatest influence on attitudes to species, followed by gender. Previous studies have mostly focused on a single stakeholder though there is the recognition of key differences between various stakeholders (Kaltenborn et al. 2006; Verissimo et al. 2009). Conservation issues commonly involve a variety of stakeholders and so initiatives to address these issues should not only recognize the potential differences in values and attitudes but also develop a more holistic approach that involves all the key stakeholders. As has been found

elsewhere (Kaltenborn et al. 2006), gender had a greater impact on attitudes than age or education and; conservation campaigns need to account for gender differences when designing marketing and communication strategies.

Differences in Perceptions Towards Species

Stakeholder Group

Appreciation of wildlife and species preferences of local communities and the international public differ, often resulting in contrasting viewpoints (Walpole and Leader-Williams 2002; Takahashi et al. 2012). Our results regarding different stakeholders groups; conservation practitioners tended to value species more positively than tourists and local communities (Fig. 3). This is not surprising given the expected professional bias of the former group and mimics results in Europe where respondents with a positive environmental attitude or behavior were willing to pay more for marine conservation (Ressurreição et al. 2012a). For local communities the existence of human–wildlife conflicts, which although at low frequency has a pronounced impact in terms of human injuries/deaths and financial losses (Kumar 2006; Takahashi et al. 2012) can explain the lower overall scores given to the different species. For tourists, it is probably a result of the lack of focus on biodiversity by the tourism industry in Valparai, which uses the landscape and its climate as its key selling point. This outcome should nonetheless be emphasized as it is crucial that conservation practitioners realize that their values might not be shared by all those involved in a given conservation issue. Further, these relationships can also be partially explained by the correlation between the stakeholder group and other audience characteristics. Tourists and conservation practitioners who appreciated the tiger more had a higher level of education, earned more and lived from away from forests, In case of the elephant, these

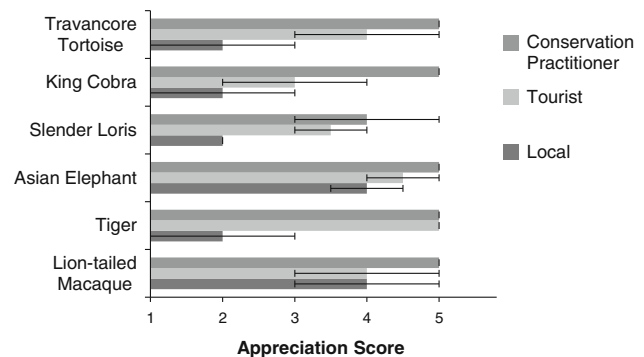


Fig. 3 Significant variation in the appreciation of the species by the different stakeholders (1 = strongly dislike, 3 = neutral, 5 = strongly like)

stakeholders were found to earn more and lived far away from forests. For the slender loris, these stakeholders were found to earn more. In case of the king cobra these stakeholders tended to be from outside the state of Tamil Nadu in India while for the Travancore tortoise they tended to have higher education levels and earned more.

Age

We expected an attitudinal difference between age groups for species like the tiger and elephant. However, it did not affect attitudes towards any of our study species. Age is less relevant in our context probably due to the ineffectiveness of current conservation campaigns towards potentially dangerous species or an indifferent reaction to species from all age groups. Similarly, age neither had an effect on conservation attitudes among local communities around the Kaziranga National Park of India (Heinen and Shrivastava 2009) nor had an effect on species appreciation among local communities in Tanzania (Kaltenborn et al. 2006). This was unlike at the Kalakkad Mundanthurai Tiger Reserve (KMTR) of India where younger respondents showed stronger support for tiger conservation (Arjunan et al. 2006) or the Seychelles where older people were more willing to pay for bird conservation projects (Veríssimo et al. 2009). In the case at Doñana Natural Protected Area in Spain younger individuals were found to be more involved in conservation; age and the education level were correlated in this case such that younger respondents had a higher level of education than older ones (Martin-Lopez et al. 2007b).

Gender

In our study, attitudes to two species, lion-tailed macaque and king cobra, differed between male and female respondents. As has been found in other studies, gender significantly affected perceptions towards species, with men generally being more positive (Zinn and Pierce 2002; Kaltenborn et al. 2006; Knight 2008). Similarly, the concern of risks posed by the mountain lion among the urban residents of Colorado was higher among women than men (Zinn and Pierce 2002) suggesting that women might tend to express a larger sense of threat when living close to potentially dangerous species. In contrast, in the Seychelles, women were more willing to financially support bird conservation projects (Veríssimo et al. 2009).

An increased female dislike of the king cobra could be from an increased sense of fear, dislike of its physical appearance and/or perception as a threat from it being a potentially dangerous species (Zinn and Pierce 2002; Knight 2008). Negative attitude towards lion-tailed macaques could be explained by the human–wildlife conflict the

species is involved in (Singh et al. 2002; Lee and Priston 2005). Lion-tailed macaques invade houses and take food from within, which antagonizes women who are largely responsible for household tasks in this region. This follows from Sarker and Røskaft (Røskaft 2010) who documented that, where a single gender was responsible for household tasks, the responsible gender viewed species that hampered these tasks more negatively.

Religion

All religions represented in the sample have particular aspects that could condition the attitudes of their followers towards wildlife. Religion-specific attitudes towards wildlife exist for all religions represented in the sample. Numerous Hindu gods and goddesses are embodied by animals. It was expected that animals such as the peafowl, elephant, and king cobra, which are prominent religious symbols in Hinduism, would be more appreciated by Hindus than by individuals practicing other religions. Although the animal embodiment of deities does not occur in Islam and Christianity, these religions do share taboos relating to the consumption of certain species. Muslims avoid the consumption of carnivorous and omnivorous animals including pigs, raptorial birds, and snakes (S.M. Saaduddin, personal communication). Christians segregate species into clean and unclean, theoretically safeguarding many species from consumptive uses (Guzik 2004). One could also expect the depiction of snakes in the Bible to impact Christian attitudes on this species.

Surprisingly, the only observed difference was that Muslims showed a more positive attitude to deer than all other religions. The reason for this result is unclear. The sale of deer meat and related products is prohibited in India by the Wildlife Protection Act, 1972 to support its conservation. Furthermore, although deerskin has been associated with some Muslim relicts such as the earlier versions of the Quran, similar religious associations exist with other religions such as Hinduism where deerskin has also been symbolically used to depict knowledge.

Education

In our case attitudinal differences occurred towards three species (tiger, Indian peafowl, and Travancore tortoise) whereby, a greater level of education was associated with a more positive attitude. Similarly, in Europe and Seychelles, respondents with a higher education were willing to pay more for marine conservation and pay for bird conservation projects, respectively (Veríssimo et al. 2009; Ressurreição et al. 2012a, b). In contrast, in India, locals with lower education in the state of Karnataka were more willing to spend time in the participatory conservation of Asian

elephants (Ninan and Sathyapalan 2005). The Indian peafowl is the national bird and the tiger is the national animal and a key flagship for conservation in the country. These differences could have resulted from an increased access to educational institutions and materials and a resulting increase in educational level, as was recorded in the case of local communities in Tanzania and India (Heinen and Shrivastava 2009), and school children in Guyana (Kaltenborn et al. 2006; Mulder et al. 2009). Further these relationships can be partially explained by the correlation between education and other audience characteristics. For the tiger and Travancore tortoise, the higher education groups were tourists and conservation practitioners and those who earned more.

Income

A higher monthly income was associated with a more positive attitude for five species in the study. For the tiger and elephant, species that are involved in human–wildlife conflicts, this could have arisen from reduced/absence of conflict or from being able to avail lifestyles/material that promote their appreciation. In contrast, support for tiger conservation in the KMTR in Tamil Nadu inversely varied with income as wealthier respondents suffered higher losses due to human–wildlife conflicts (Arjunan et al. 2006). However, in Europe, higher earning respondents were willing to pay more for marine conservation than others (Ressurreição 2012b). The reason behind why those who did not earn any income positively appreciated the Travancore tortoise could have arisen from the species being a free protein source and collected for subsistence by local communities (Kanagavel and Raghavan 2012). The slender loris is associated with negative taboos (Kanagavel et al. 2013) and an increased appreciation with higher income suggests a consequential degradation of these taboos. The increased appreciation for the Nilgiri tahr due to higher income is however, not understood. Further, these relationships can be partially explained by the correlation between income and other audience characteristics. Appreciation for the tiger and the Travancore tortoise that was higher among higher earning groups were found to possess a higher education levels and were tourists and conservationist practitioners, Towards the slender loris and elephant these higher earning groups were tourists and conservationist practitioners,

Geographical Origin

Culture through folklore, regional identity, traditional, and cultural beliefs has been identified as influencing attitudes towards wildlife (Bowen-Jones and Entwistle 2002). Conservation attitudes have been found to differ among the

different socio-ethnic groups residing around Kaziranga National Park in India (Heinen and Shrivastava 2009), although in the case of the crocodiles in the Philippines this was not found (van der Ploeg et al. 2011). In our case, given the discrepancies in sample size since the two respondents from “other Indian states” were both conservation researchers from the neighboring state of Andhra Pradesh and only one respondent was from a foreign country (USA), we are only able to discuss the differences between the respondents from Tamil Nadu and Kerala. Although Valparai is situated in the state of Tamil Nadu, a large number of individuals from the neighboring state of Kerala either temporarily live in Valparai or have been settled there for several generations. This makes the social context more heterogeneous given the cultural differences between the two states, which could influence attitudes towards species. The difference in perceptions resulted with individuals from Kerala being more negative towards the king cobra than from Tamil Nadu. This is counterintuitive since snake worship exists in the two states and it may even be more prominent in Kerala due to the presence of a temple and several sacred groves dedicated to serpents. Furthermore, snake-related human mortalities are higher in Tamil Nadu than Kerala (Mohapatra et al. 2011). The relationship can then be partially explained by the correlation between geographic origin and the stakeholder group, such that those from states other than Tamil Nadu tended to be tourists and conservation practitioners, who rated the species higher.

Distance from Forest Areas

The distance of respondent households’ from forest areas only influenced attitudes towards species that are known to be involved in human–wildlife conflicts. Similar attitude patterns have been found in relation to wolves (*Canis lupus*) in Scandinavia, snow leopards in Pakistan and Asian elephants in Bangladesh (Hussain 2003; Karlsson and Sjoström 2007; Sarker and Røskaft 2010). This reinforces the need to consider the impact, living within a species range may have on an individual’s attitude, when developing conservation campaigns. In our case this characteristic was correlated with the stakeholder group such that those individuals with positive appreciation for the tiger and the elephant who stayed far away from the forests tended to be tourists and conservation practitioners.

CONCLUSION

Conservationists often aim to address the needs of wildlife conservation by invoking concern and support for conservation from the “general public” (Bowen-Jones and

Entwistle 2002; Smith and Sutton 2008; Walston et al. 2010). Our results highlight that there is vast heterogeneity in attitudes to species within small audiences and that campaigns targeting a homogenous “general public” may alienate many relevant parties and ineffectively use limited resources. We also show that the impact of different audience characteristics is varied, with some factors having wide-scale impacts while others affect only a few species. Whilst care should be taken when extrapolating any of these results to other cultural, economical, or social contexts, our findings suggest that the “general public” concept is wholly more complex than is often recognized.

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