Information about conservation status is more important than species appearance in species preferences of potential conservation donors

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Abstract

There are huge differences in the conservation support and attention received by different species, maybe because of preferences for specific aesthetic traits, such as body size and colouring. If there are inherent preferences, then new flagship species should be aesthetically similar to existing successful flagship species and conservation campaigns should not feature less attractive species. However, cultural preconceptions about species and the covariance of traits make it difficult to determine the role of aesthetic traits. Both these problems can be overcome with imaginary animals. If preferences for certain species traits are inherent in the human psyche, then the same preferences should be found in both real and imaginary animals. Using an online survey with US participants, we find aesthetic traits are associated with preferences for real, but not imaginary animals. For both real and imaginary animals, small and declining populations are preferred. We therefore suggest organisations should not reject potential flagship species based on appearance. Consistent preferences for poor conservation status, plus the ability now to use our results to predict donations to real animal species, suggest conservation support for specific species could be encouraged if organisations communicate information about population sizes and trends.

Keywords: flagship species, online survey, environmental philanthropy, imaginary animals, conservation marketing

Introduction

Popular species are those which are 'liked, enjoyed, or supported by many people' (Cambridge Online Dictionary, 2022) and there are huge differences among species; not just in terms of public and media interest, but also in research and conservation support (Kellert, 1985, Correia et al. 2016, Colléony et al. 2017, Davies et al., 2018, dos Santos et al. 2020, Adamo et al. 2021)**.** The tiger (*Panthera tigris*) was the most googled animal and received US$44.9 million in conservation aid between 2004 and 2014 (Davies et al., 2018), three times more than the next most funded species. The Christmas Island pipistrelle bat (*Pipistrellus murrayi*) was declared extinct in 2016, but this received almost no media attention and there was limited government support for conservation action (Watson, 2016). These differences are not limited to animals; Adamo et al. (2021) found the number of scientific publications ranged from 0 to 571 for 113 endemic plants in part of the relatively well-studied European Alps. These different measures of species popularity seem to be correlated (Martín-López et al 2009, Troudet et al. 2017, Jarić et al. 2019, Wang et al. 2021), and multiple papers have tried to quantify what makes species popular, both to draw attention to species which are relatively unattended (Davies et al., 2018) and to identify species which can, for example, raise conservation awareness (Veríssimo et al. 2014).

More popular species tend to be large (Smith et al. 2012, Correia et al. 2016, Macdonald et al. 2016, Adamo et al. 2021) and colourful (Breuer et al. 2015, Garnett et al. 2018, Adamo et al. 2021), just two of many aesthetic traits which have been associated with species popularity. Certain behaviours and population traits are also associated with species popularity. For example, Swiss children prefer insects which fly to those which crawl (Breuer et al. 2015), and various studies have shown species which are more endangered receive more conservation donations than those that are not (e.g. Tisdell, 2006, Tisdell et al. 2007, Curtin

& Papworth, 2018). Many such studies search for traits which are assumed to be inherently, and to some degree, universally, popular. For example, preferences for certain aesthetic traits have been associated with the baby schema concept and the ‘uncanny valley’ theory (Rádlová et al. 2018).

Whether or not there are inherent preferences for specific traits is important information for choosing successful conservation flagship species. Conservation science is a crisis discipline, which uses limited funds to prevent and reverse the negative impact of human activities on biodiversity (Bottrill et al., 2008), and flagship species are a key tool used to raise money and awareness (Veríssimo et al. 2011). The flagship species approach often targets individual donors, which can be important contributors to conservation non-governmental organisations (NGOs) – for example 14% to 89% of funding for ten marine NGOs reviewed by Berger et al. (2019) came from individual contributions. Previous research on flagship species has shown substantial differences in the fundraising ability of different species: there was a five-fold difference in donations between the most and least successful species in an evaluation of Australian Geographic Society fundraising campaigns (Veríssimo et al. 2018). A variety of aesthetic traits have been identified which are associated with how successful species are at raising awareness and funds (Curtin & Papworth, 2020), and if donations are driven by inherent preferences for specific aesthetic traits, new flagship species should by aesthetically similar to existing successful flagship species, as suggested by Smith et al. (2012). If certain aesthetic traits drive successful flagship species, this could suggest conservation organisations should not invest time in campaigns which feature species with traits which are less ‘attractive’, even if these species are threatened and need conservation attention. Therefore, understanding whether preferences for specific traits are an inherent part of the human psyche is crucial for the selection and use of flagship species.

There is substantial evidence of cultural differences in species preferences, which is not consistent with inherent preferences for certain species traits. For example, lions (*Panthera leo*) are popular with schoolchildren in the U.K., but disliked by schoolchildren living around a National Park in Tanzania where lions live (Entwistle & Stephenson, 2000). If preferences for specific traits are an inherent part of the human psyche, we would expect to find preferences for species which have those traits regardless of cultural frame. The ubiquity of cultural preconceptions about the natural world makes it difficult to untangle the role of inherent preferences and cultural frames (Montgomery, 2002, Garnett et al. 2018, Curtin & Papworth, 2020), particularly when investigating preferences for multiple species. Furthermore, identifying preferences for specific traits in real animals is complicated by the covariance of many traits. Big cats are popular, but this could be because they are physically large, or because they have forward facing eyes, or because they are mammals; these are all traits which are correlated with species popularity (Macdonald, Burnham, Hinks, Dickman, Malhi, & Macdonald, 2015).

One way to overcome these issues is through the use of hypothetical species. Each trait of a hypothetical species can be varied individually, and presented without contexts which might trigger associations with existing, real species. This approach was first used by Montgomery (2002) using written descriptions of hypothetical species, and found ecological functions which benefitted humans were more important to 417 US participants than other species traits (including aesthetics). This suggests appearance and preferences for specific aesthetic traits may be less important in the absence of existing cultural frames for a species (for example, if a species is unknown or poorly known). Garnett et al. (2018) conducted the only prior study which compared preferences for real and imaginary animals in a conservation context. Based on written descriptions, they found 638 Australians preferred endangered, smaller, more colourful hypothetical birds which are less confiding and have melodious songs. However, when asked to name the Australian birds they thought most attractive, species with these traits were not selected as often as expected - many participants named larger, less colourful birds with harsh-sounding calls.

One drawback of descriptions is that they are open to interpretation by participants; for example, Montgomery (2002) described one species as having 'beautiful colours and unique shape'. This problem is solved by using images of imaginary animals. A study of 407 participants using this approach showed participants preferred to donate money to large, multi-coloured and cool-toned imaginary animals (Curtin & Papworth, 2020), and these preferences for imaginary animals could be used to predict donations to real, species-focused conservation charities. However, this study only investigated preferences for aesthetic traits, not the role of other traits such as population status, nor did it compare preferences for real and imaginary animals within the same group of participants to establish whether the findings on imaginary animals also applied to real animals. The present study addresses these gaps by investigating and contrasting preferences for imaginary and real animals in a US online community. We assume that if preferences for certain species traits are inherent preferences, then the same preferences will be found in both real and imaginary animals. Specifically, this study was designed to address the following questions:

1. Are preferences for unknown species affected by the provision of information about conservation status, attention and benefits for humans?
2. Are preferences for real animals guided by the same aesthetic and informational traits as preferences for imaginary animals?
3. Can stated preferences for real and imaginary animals predict revealed preferences for species donation?

Methods

Survey 1: The role of imaginary animal appearance and information provision in participant choices

A survey was designed to investigate whether preferences for unknown species could be affected by provision of information about conservation status and attention and benefits for humans. The survey started with demographic questions (gender, age, education, location), questions about past donations to and volunteering for conservation organisations, and participation in wildlife orientated activities. This was followed by a discrete choice experiment (DCE) where participants were presented with choices between two imaginary animals in an unlabelled, unforced stated choice DCE with a mix and match factorial design (Rose & Bliemer, 2009). DCEs are a widely used to understand participants' stated and revealed preferences (Rose & Bliemer, 2009), and have previously been used to understand conservation donation and species preferences (e.g. Garnett et al. (2018)). Individuals are presented with a series of choices between two or more options which are designed to investigate preferences for specific choice characteristics. In this experiment, two imaginary animals of different appearances were presented in each choice pair, with invented information about their population size and trend, level of conservation attention and species benefit for humans (e.g. whether the species provides ecosystem services or is a crop pest, Table 1 and Fig. 1). The aesthetic traits which varied were selected based on a previous study using the same imaginary animals (Curtin & Papworth, 2020). These animals were designed by mural design artist Rory McCann (https://rorymccannmurals.com/) in three 'morphs' and varied in their eye direction, colouring (number of colours and tone), body size, and whether or not they had fur. Additional information on the design and appearance of the imaginary animals is provided in Curtin and Papworth (2020). Quantitative information on invented population size and trend was based on IUCN Red List criteria. Qualitative information on conservation attention and species benefit for humans was also included (see Table 1). For each choice pair, participants were asked ‘which of these animals would you rather conserve?’. An opt-out choice (‘neither of these’) was included. Four blocks of nine choices between pairs were generated using the ‘rotation.design’ function in the R package ‘support.CEs’ (Aizaki, 2012). Participants were randomly assigned to one block.

After choosing between the pairs, participants were invited to explain why they made the choices they did. These qualitative data were analysed to identify themes, and provide context for the quantitative analyses presented here (see supplementary materials). To assess participants’ revealed choices, at the end of the survey participants were informed the project would donate US$0.50 on their behalf to the Zoological Society of London’s EDGE of Existence programme, which targets taxonomically diverse species which are globally endangered and evolutionarily distinct (Isaac et al. 2007). Giving participants choices between animals but directing all donations to the same organisation (rather than asking participants to select between organisations with different focal species, see Curtin & Papworth (2020)) ensured participants made their selection based on the species rather than the organisation. Participants were asked which of 17 EDGE species (see supplementary materials) shown in photos they would most like to see conserved, with an option to request no donation be made on their behalf.

<u>Survey 2: The role of appearance and information provision on participant choices for imaginary and real animals.</u>

A second survey was designed after the first survey was completed and analysed to investigate whether preferences for real animals were influenced by the same factors associated with preferences for imaginary animals. Therefore, participants were presented with choices between animals in two DCEs, one with imaginary animals and the other with real animals. These two DCEs were designed simultaneously to ensure congruence between the variables investigated. To reduce the number of choice options we limited population size and trends to two categories (see Table 1). Benefits for humans was excluded as for real animals this can vary with cultures and different individual experiences, thus it was difficult to identify appropriate real animals (for example, some consider beavers beneficial for flood prevention, others view them as pests, McKinstry & Anderson, 1999). Conservation attention was also excluded as it was not identified as important in survey 1 and it is difficult to classify the differing types of conservation attention received by real animals into meaningful ordinal levels.

For the real animals, we contrasted mammals and birds rather than furred and unfurred animals. Birds of prey, primates, felids and a limited number of other species groups (e.g. *Didelphis* species) were considered to have forward facing eyes (Heesy, 2004). We identified species population sizes and trends from the IUCN Red List, and considered species with populations over 10,000 individuals to have large populations, and those with fewer than 5,000 individuals to have small populations. These changes from the values used in survey 1 were necessary as few species have very small populations. Colours and patterns were classified visually, but there are few animals which are truly ‘single coloured’. Therefore, when selecting animals we ensured contrasts were evident between each pair (Fig. 2). The large differences in body mass between birds and mammals meant different definitions for ‘small’ (<1kg for birds and <12kg for mammals) and ‘large’ (>1.2kg for birds and >19kg for mammals) species, though as with colours the contrast between species in a pair was considered in the design (e.g. the largest ‘small’ mammal, the Tonkin snub-nosed langur, *Rhinopithecus avunculus*, was contrasted with the largest ‘large’ mammal, Grevy’s zebra, *Equus grevyi*). There were some restrictions for the experimental design as we were unable to identify a real animal which had forward facing eyes, was under 12kg and a cool-toned single colour, and was assessed by the IUCN Red List to have a stable population with less than 5,000 individuals. We therefore had to generate three study designs using the 'rotation.design' function (Aizaki, 2012) before generating a design where we were able to identify suitable real animals for the variable combinations. Once suitable real animals were identified, Rory McCann (https://rorymccannmurals.com/) drew images using the same medium as used for the imaginary animals.

For the imaginary animals DCE, four blocks of six choice sets were generated using the 'rotation.design' function (Aizaki, 2012). Participants were randomly assigned to one block. For the real animals DCE, a single block with eight choice sets was completed by all participants. In the final section where participants were asked to select an EDGE species, information about the species population size and trend (where available) was included as well as the pictures. All other aspects of the survey were identical to survey 1.

Distribution and data quality

Both surveys were designed in the online survey tool 'Qualtrics' (Qualtrics, Provo, UT). Survey populations were recruited from Amazon Mechanical Turk (MTurk) and paid US$0.35, the amount recommended by MTurk for the survey length. In the first survey, participants from any country could participate, but analyses were restricted to those from the USA after data collection. In the second survey, only those from the USA were invited to participate. All participants were over 18 years of age and only those who reported engaging in conservation-related donation or volunteering behaviors were considered for inclusion. MTurk has a diverse participant pool, and allows rapid, cost-effective data collection which outperforms panel data (Kees et al. 2017) and has been used in various previous conservation papers (e.g. Thomas-Walters & Raihani, 2017). Nevertheless, there are documented concerns surrounding the reliability of data from MTurk (Chmielewski & Kucker, 2020). Therefore, measures were employed to minimize the inclusion of fake participants or ‘bots’. Surveys completed in less than one third of the median time (speeders in Table 2, Macdonald et al. 2015) were excluded. Three multiple choice questions with randomised answer order were included: one question on self-reported involvement, one attention check, and one instructional manipulation check (Kees et al. 2017). Only participants who passed at least two of three data quality checks were included in analyses (Data quality measurement, Table 2). A final check was applied to the ‘free-text’ questions, with participants removed if their answers suggested the question was not understood (misinterpreted questions in Table 2, Chmielewski & Kucker, 2020).

Analyses

Analyses were conducted in R 3.6.3 (R Development Core Team, 2020). The DCE was analysed using mixed logit models (Aizaki, 2012). Estimates from the DCE models were used to predict preferences for the EDGE species shown at the end of each survey. As the EDGE species were presented without accompanying information in survey 1, only aesthetic traits were used to predict preferences from the survey 1 DCE. In survey 2, participants were presented with information on the population size and trend (when available), so all variables were used to predict preferences from DCEs in survey 2. For species where information on population size or trend were unavailable (thus stated as ‘unknown’ for participants), predictions were made for both variable levels (e.g. both large and small populations) and the mean value used in analysis. For EDGE species which were neither a bird nor mammal (e.g. Round Island boa, *Casarea dussumieri*), predictions were made for both categories and averaged. For predictions from the imaginary animal DCEs, the probability of selecting animal type ‘C’ with the same aesthetic traits was calculated. Generalised linear models were used to determine whether the predicted preferences could predict the number of participants who chose each EDGE species, with Gaussian, poisson and negative binomial errors distributions (from the package MASS, Venables & Ripley, 2002) compared for model fit using the package ‘performance’ (Lüdecke et al. 2021).

Results

Participants

Two hundred and seventy eight and 342 participants completed surveys 1 and 2 respectively, being based in the USA with a previous history of donation to or volunteering for conservation or nature organisations (Table 2). In both surveys, most participants were under 39 (68% in survey 1 and 62% in survey 2), in full time employment (77% and 70% respectively) and had a Bachelor’s degree or higher qualification (75% and 74% respectively).

DCE results

Compared to animals with reported population sizes of 200 individuals, the 278 participants in survey 1 were less likely to select animals with 2000 individuals, and about half as likely to select animals with 9000 individuals (Table 3, Fig. 3). Participants were more likely to select animals with reported declining trends compared to animals with reported stable population trends, with more than twice the likelihood for animals with reported 80% decline and an intermediate value for those with 30% decline. Compared to neutrally described species, participants were more likely to select animals which were described as beneficial and less likely to select animals which were described as pests. There was no effect of the level of conservation attention received or the experimentally manipulated aesthetic traits, though participants were less likely to select animals of type A and B than animal type C (Table 3). Two hundred and thirty five participants provided free text explanations of why they chose the animals they did (Table S1), with ecological role (mentioning the relationship between the animal and the wider environment) the most common theme (n = 86).

Participants also mentioned population trend (n=57), population size (n=53) and conservation effort (n=32), but fewer mentioned the animals' appearance (n=14).

When presented with imaginary animals, the 342 participants in survey 2 had comparable results to survey 1 (Table 3, Fig. 3); participants were half as likely to choose a species with a large population and almost four times as likely to choose a species with a declining population. No significant effect of appearance was found except participants were less likely to select animals of type A and B compared to animal type C. Two hundred and eighty-five participants provided free text explanations of their choices, and population trend was most commonly cited (n=157), although appearance (n=72) and population size (n=60) were also often mentioned (Table S1).

When these same 342 participants chose between real animals, specific aesthetic traits did affect their choices (Table 3, Fig. 3). Participants were half as likely to select animals with sideways facing eyes, and less likely to select cool-toned animals. Contrary to expectations, participants were more likely to select bird than mammal species, but remained around half as likely to select species with larger populations and more than four times as likely to select those with declining populations. Two hundred and sixty-six participants provided free text explanations of their choices for real animals with most mentioning population trend (n=167) and some mentioning population size (n=56). References to appearance (n=31) were fewer, although 16 participants reported choosing a particular type of animal (Table S1).

Revealed choices

Across both surveys, the red panda was most often selected by participants and the West African dwarf crocodile least often selected (Table S2). Number of donors for each species was positively correlated between surveys 1 and 2 (Spearman's rho=0.65, S statistic=338.4, p=0.003). Predicted preferences for the 17 species from survey 1 were positively correlated with the number of participants selecting each species (negative binomial regression, n=17, χ^2=11.56, Nagelkerke's R^2=0.36, p=0.003). The black rhino was excluded as an influential outlier for both analyses using predictions from survey 2 (Cook's distance>0.5). It was the only species with a stable population and the large effect size of population trend meant predicted preferences were 2.9 and 3.3 standard deviations below the mean for the real and imaginary animal predictions respectively. For the 16 remaining species, the number of donations was positively correlated with both predictions from the imaginary animal DCE (negative binomial regression, n=16, χ^2=9.88, Nagelkerke's R^2=0.27, p=0.007) and real animal DCE (negative binomial regression, n=16, χ^2=13.11, Nagelkerke's R^2=0.49, p=0.001).

Discussion

Conservation status and benefits for humans affected preferences for imaginary animals in the predicted directions, with potential conservation donors preferring animals with small, declining populations which were beneficial for humans. These results show information provision can affect preferences for unknown species, supporting prior research which shows these traits can affect preferences for real species (Tisdell, 2006, Wilson & Tisdell, 2005, Schlegel & Rupf, 2010, Curtin & Papworth, 2018). Although there were differences in preferences for the three imaginary animal morphs, no effect of specific aesthetic traits was found. This contrasts with preferences for larger, cool-toned and multi-coloured animals found by Curtin and Papworth (2020) using the same methodology and imaginary animals. Combined, this suggests that specific aesthetic traits may influence choices in the absence of other information (Curtin & Papworth, 2020), but these effects are eclipsed by information provision, specifically information about conservation status and benefits for humans. This is supported by participants' post-hoc justifications – very few mentioned animal appearance and the most common themes referenced ecological roles, or population size and trend. Previous studies which have investigated preferences for hypothetical animals have found effects of both aesthetic and non-aesthetic traits (e.g. colour and conservation status, Garnett et al. 2018). However, like the present study, Montgomery (2002) found aesthetic traits less important than other traits measured in their study, for example, ecological benefits. Thus using non-aesthetic traits (e.g. conservation status) to select potential conservation flagships might be more successful than basing selection on aesthetic traits.

In this study we found the effects of population size and trend were of a similar magnitude and had overlapping confidence intervals for real and imaginary animals. Prior research on real animals shows that providing information about IUCN threat status can change donor preferences, leading them to prefer more threatened species (Veríssimo et al. 2017, Curtin & Papworth, 2018). Garnett et al. (2018) found stated preferences for more threatened species, but very few participants selected threatened species as their named preferred species. Unlike aesthetic traits, which a participant can identify from a picture, informational traits such as conservation status can only be used to guide preferences if a participant is aware them. This could be either because a participant has prior knowledge of the species, or because others provide this information (as was the case in this, and other studies mentioned above). This may explain why few participants named threatened species in the study by Garnett et al. (2018) – they may be unaware of the relative conservation status of animals which they know.

When participants participated in matched DCEs on imaginary and real animals, there was evidence to support the role of specific aesthetic traits in decision-making for real, but not imaginary animals. When choosing between real animals, participants preferred warm-toned birds with forward facing eyes, which contrasts with the lack of effect found in this study and the preference for large, cool-toned and multi-coloured imaginary animals in Curtin and Papworth (2020). We argue that this suggests that the preferences for certain aesthetic traits found across various studies are not inherent. One explanation for these previous findings is correlation between seemingly preferred aesthetic traits and other traits which are actually preferred. For example, in some species groups, animals with greater body mass tend to be at greater risk of extinction (Chichorro et al. 2019). The potential for these correlations was highlighted in this study by the difficulty in identifying real animals with certain trait combinations; there are very few species with some traits, and other traits are only found in closely related species. For example, most animals with forward facing eyes are either primates or felids, but it may not be this trait which makes these groups popular. For example, primates may be popular due to their similarity with humans, and felids popular for their predatory behaviour; both traits were suggested by Kellert (1985) as important in influencing preferences for animals in the USA.

This study showed that stated preferences for real and imaginary animals can predict revealed preferences for species donation. All three experiments were able to predict the number of donations received by real EDGE species, although the variance explained by the model (described using Nagelkerke's R^2) was greatest when predicting from preferences for real animals. Therefore, even though the underlying mechanism for species preferences remains unknown, the preferences found in this research were able to predict participant behaviour. Regardless of the mechanism, consistent preferences for poor conservation status in this and other studies suggest the conservation of both well-known and little known species could be encouraged if organisations communicate information about their population size and trends. However, there are likely differences between individuals in which species appeal and how much they are willing to donate, as found by Lundberg et al. (2020) in their study of US and UK conservation donors. Further research which identifies similar groups of donors and tests possible mechanisms of species preferences would provide guidance about which traits to investigate as predictors of conservation philanthropy, and improve the accuracy of predictions. Investigation of more diverse and less easily quantified species traits, such as intelligence (Kellert, 1985), may identify other traits which are more important than species appearance, and improve predictions of conservation philanthropy. However, for these less physically tangible traits, the perceptions of traits are likely more important than the traits themselves, and will be mediated by cultural knowledge, consistent with the theory of flagship species action (Jepson & Barua, 2015). For example, even though recent research shows chickens are more cognitively complex than previously believed (Marino, 2017), public perceptions of chicken intelligence will not necessarily reflect this research. Research which identifies cultural perceptions associated with successful flagships and popular species and then tests whether lesser known, less popular species can be relocated within these frames using conservation marketing techniques, may be a fruitful area for future applied research.

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Conflict of Interest

None

Ethical Standards

The study was approved by the Royal Holloway Ethical Approval Process.

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Figure 1. Example presentation of two options in the imaginary animal DCE in survey 1. The two animals are both large and single-coloured, but the upper imaginary animal is cool-toned animal type C and the lower is warm-toned animal type A. The two animals also have differences in non-aesthetic traits, as communicated in the text above. An opt-out (‘neither of these’) was also included.

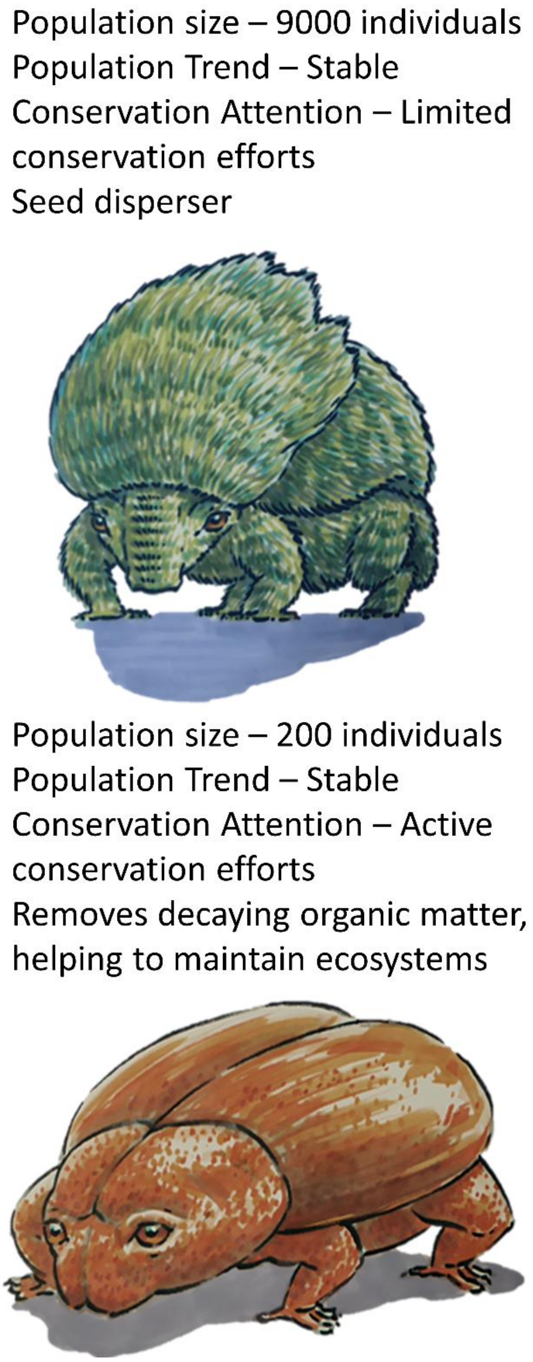

Figure 2. Example presentation of two options in the real animal DCE of survey 2. The Eurasian lynx (*Lynx lynx*) was classed as large, warm-toned and multi-coloured when contrasted with the Jamaican blackbird (*Nesopsar nigerrimus*), which was classed as smaller, cool-toned and single coloured. An opt-out (‘neither of these’) was also included.

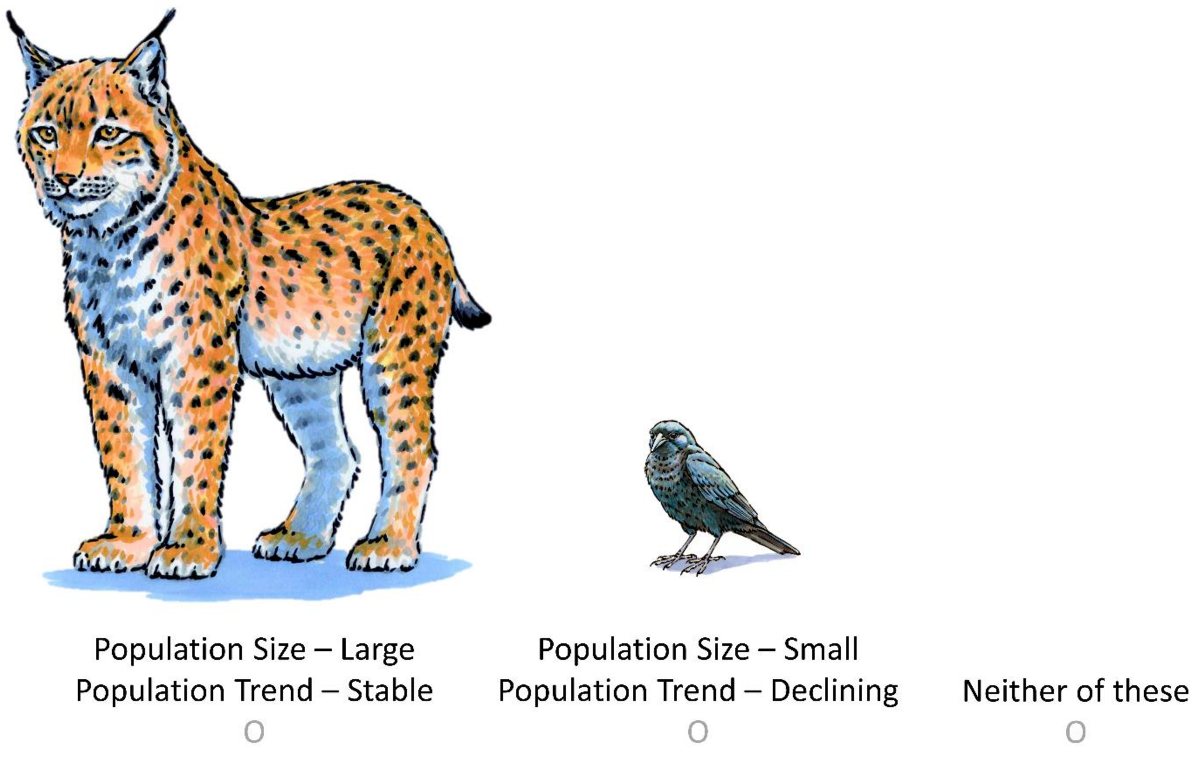

Figure 3. Study design of the three discrete choice experiments, with icons showing which traits participants preferred in each study. Across all three experiments, participants preferred animals with small and declining populations. In survey 1, participants preferred animals which benefited humans, but neither this nor conservation attention were included as variables in survey 2. No preferences for aesthetic traits were found for imaginary animals, but participants preferred real animals which were birds, warm-toned, and with forward facing eyes.

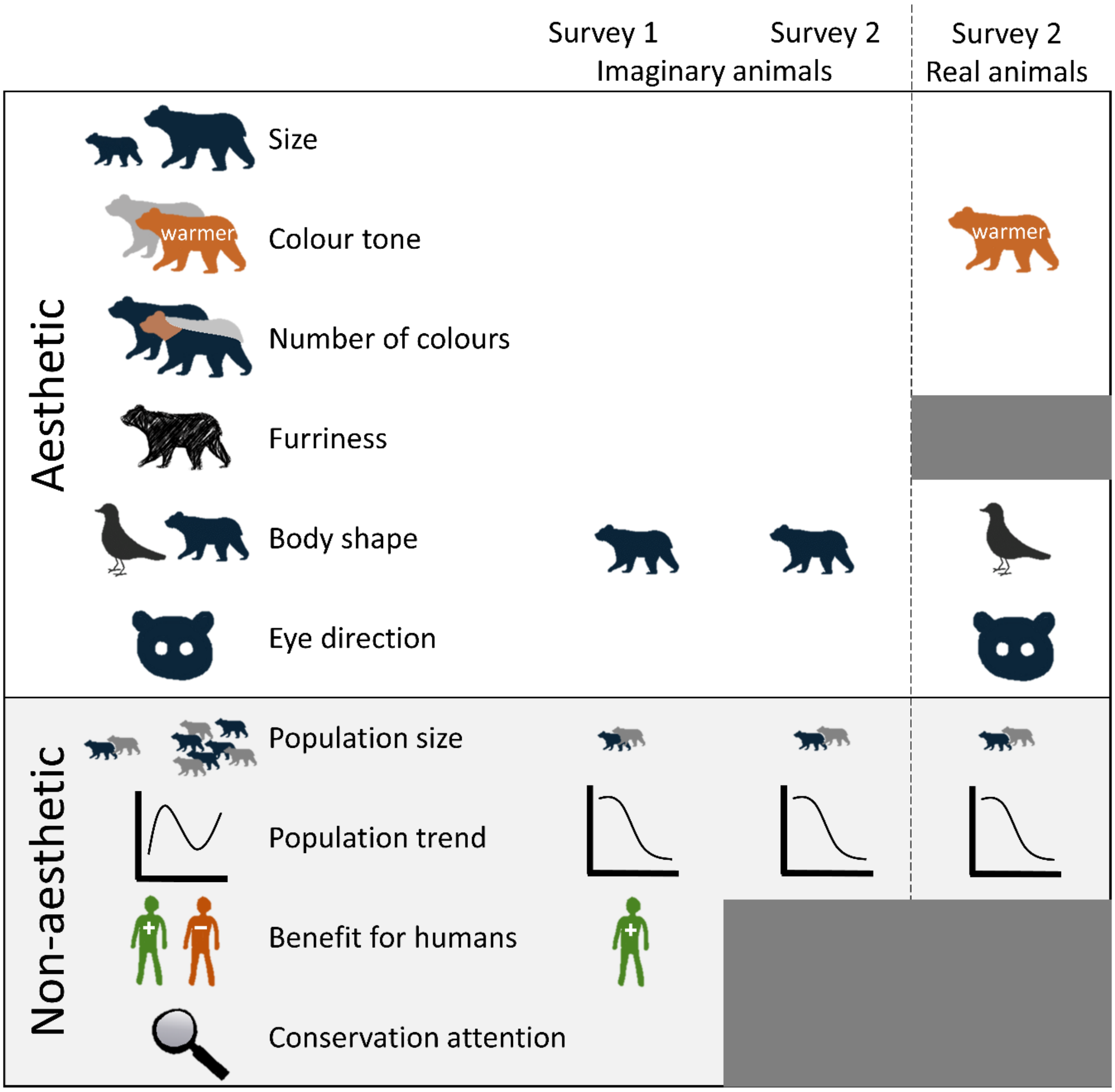

Table 1: Explanatory variables included in discrete choice experiments. Predictions for aesthetic traits follow the results of Curtin and Papworth (2020). * IUCN critically endangered criteria C. ** IUCN critically endangered criteria A.

Variable	Prediction	Levels (survey 1)	Levels (survey 2)
Eye direction	No effect	forward facing / side facing	forward facing / side facing
Fur	No effect	furred / unfurred	furred / unfurred
Colour tone	Prefer cool-toned animals	warm tones / cool tones / dull tones	warm tones / cool tones
Number of colours	Prefer multi coloured animals	single colour / multi coloured	single colour / multi coloured
Body size	Prefer larger animals	small / medium /large	small / large
Population size	Prefer more threatened animals (Curtin & Papworth, 2018; Tisdell, 2006; Wilson & Tisdell, 2005)	200 individuals / 2000 individuals / 9000 individuals *	fewer than 5000 individuals / more than 10000 individuals
Population decline	Prefer more threatened animals (Curtin & Papworth, 2018; Tisdell, 2006; Wilson & Tisdell, 2005)	80% decline over 3 generations / 30% decline over 3 generations / stable **	stable / declining
Conservation attention	No preference (Veríssimo et al., 2017)	None / limited / active	not included
Benefit for humans	Prefer beneficial, then neutral, then pest animals (Schlegel & Rupf, 2010)	Pest / beneficial / neutral	Not included

Table 2: Reasons for removal of participants who started surveys 1 and 2 and demographic characteristics for participants included in analysis. Note that in survey 2, only MTurk workers from the USA were permitted to start the survey.

		Number of participants	
		Survey 1	Survey 2
Participants starting the survey		714	682
Reasons for removal	Survey not completed	96	129
	Not situated within the USA	134	0
	No History of Donating Behavior	122	147
	Speeder	8	15
	Failed Data Quality Measurement	73	42
	Misinterpreted questions	3	7
Total Participants Removed		436	340
Total Participants included		278	342
Demographic characteristics			
Sex	Female	143	146
	Male	135	194
	Prefer not to say	0	2
Age	18-29	104	97
	30-39	84	116
	40-49	48	54
	50-59	25	43
	60-69	16	29
	70+	1	3
	Prefer not to say	0	0
Employment	Full time	213	240
	Part time	36	56
	Retired / Student /Unemployed	28	42
	Prefer not to say	1	4
Education	No qualifications	1	1
	High School Diploma	69	87
	Bachelor’s degree	148	194
	Postgraduate degree	60	60
Donated Money to a Conservation Project	No	45	83
	Yes	233	259
Donated Money for a Specific Species	No	118	158
	Yes	160	184
Volunteered for a Conservation Project	No	153	207
	Yes	125	135
Donated Money to a Nature Project	No	37	50
	Yes	241	292

Table 3: Model estimates from three discrete choice experiments across two surveys. Hazard ratios greater than 1 suggest an animal with the trait is more likely to be selected, and below 1 suggest it is less likely to be selected. Variables where p<0.05 are shown in bold.

	Hazard ratio (95% confidence interval), Z statistic and p value		
Variable	**Imaginary animals (survey 1)**	**Imaginary animals (survey 2)**	**Real animals (survey 2)**
Selection of an animal rather than	**6.03(4.48-8.11), Z=11.87, p<0.001**	**2.37(1.86 -3.03), Z=6.92, p<0.001**	**4.83(3.54 – 6.58), Z=9.96, p<0.001**
Size (Medium)	1.03(0.88-1.21), Z=-0.35, p=0.724		
Size (Large)	1.02(0.86-1.21), Z=0.26, p=0.796	1.01(0.89-1.16), Z=0.21, p=0.837	1.10(0.98 – 1.24). Z=1.62, p=0.106
Eye direction (side)	0.88(0.76-1.01), Z=-1.88, p=0.060	0.96(0.82 – 1.11), Z=-0.58, p=0.561	**0.48(0.39 – 0.58), Z=-7.26, p<0.001**
Number of colours (three colours)	1.07(0.94-1.21), Z=1.01, P=0.314	1.07(0.92 – 1.23), Z=0.872, p=0.383	0.96(0.80 – 1.15), Z=-0.42, p=0.674
Colour tone (cool)	1.04(1.87-1.21), Z=0.45, p=0.656	0.89(0.77-1.03), Z=-1.55, p=0.122	**0.61(0.54 – 0.70), Z=-7.42, p <0.001**
Colour tone (dull)	1.17(0.96-1.44), Z=1.58, p=0.114		
Not mammalian (unfurred)	0.88(0.76-1.02), Z=-1.76, p=0.083	0.92(0.81 – 1.05), Z=-1.21, p=0.226	
Bird			**1.18 (1.04 – 1.33), Z=2.65, p=0.008**
Animal type (A)	**0.75(0.64-0.88), Z=-3.55, p<0.001**	**0.51(0.43 – 0.61), Z=-7.33, p<0.001**	
Animal type (B)	**0.76(0.63-0.91), Z=-2.99, p=0.003**	**0.72(0.62 – 0.85), Z=-3.94, p<0.001**	
Population size (medium)	**0.61(0.52-0.71), Z= -6.34, p<0.001**		
Population size (large)	**0.49(0.42-0.56), Z=-9.54, p<0.001**	**0.53(0.45-0.61), Z=-8.24, p<0.001**	**0.52(0.44 – 0.61), Z=-7.85, p<0.001**
Population trend (moderate decline)	**1.84(1.54-2.20), Z=6.60, p<0.001**		
Population trend (severe decline)	**2.16(1.82-2.55), Z=8.92, p<0.001**		
Population trend (decline)		**3.92 (3.40–4.52), Z = 18.79, p < 0.001**	**4.60 (4.07–5.19), Z = 24.54, p < 0.001**
Conservation attention (limited)	0.96(0.80-1.16), Z=-0.40, p=0.686		
Conservation attention (active)	1.03(0.86-1.22), Z=-0.29, P=0.772		
Pest species	**0.40(0.34-0.47), Z=-10.84, p<0.001**		
Beneficial species	**1.48(1.22-1.80), Z=3.99, p<0.001**		
	Concordance = 0.77(±SE0.01), Adj. rho^2=0.25	Concordance = 0.73(±SE0.01), Adj. rho^2=0.18	Concordance = 0.83(±SE0.01), Adj. rho^2=0.34