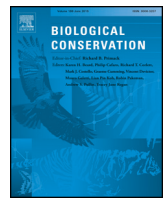




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## Human preferences for species conservation: Animal charisma trumps endangered status

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### ABSTRACT

A good deal of research has recently focused on people's commitment to biodiversity conservation by investigating their "willingness-to-pay" (WTP). Because of the public's self-reported preferences for species that are more charismatic or similar to humans, conservation programs are often biased toward these species. Our study aimed to explore the determinants of WTP among 10066 participants in a zoo conservation program. The program aims to raise money to support conservation programs and involves donating a sum of money to "adopt" an animal in the zoo. We explored whether participants were influenced by particular scientific characteristics of the animal (IUCN conservation status and phylogenetic distance from humans) or by more affect-related characteristics, such as the charisma of the animal. We found that participants did not choose an animal to adopt because of the endangered status of the species, and did not donate more to endangered species than to other species. Instead, they were more likely to choose a charismatic species. However, surprisingly, those who chose a less charismatic species gave more money on average to the program than those who adopted more charismatic species, suggesting a higher level of commitment among the former. These results therefore suggest that this type of conservation program may not be an effective way of reconnecting people with conservation issues related to endangered species. We therefore advise zoos to communicate more strongly on the level of threat to species and to increase the ratio of endangered over charismatic species in their animal adoption programs.

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### 1. Introduction

The accelerating loss of biodiversity is now widely acknowledged, with a steep increase in the number of species listed as Critically Endangered (e.g. from 168 to 209 mammal species) or Endangered (e.g. from 31 to 810 amphibian species) from 1996 to 2015, according to the International Union for Conservation of Nature Red List of endangered species (IUCN, 2015).

Ambitious conservation policies depend on people's concern for biodiversity, which determines their commitment. One way of investigating their concern is to analyze their willingness-to-pay (WTP) (Balmford et al., 2004; Bateman et al., 2013; Togridou et al., 2006; Zheng et al., 2013). Most studies have focused on the value given to ecosystems (Balmford et al., 2004). Among the few studies that have explored the value given to species, all of them, to our knowledge, have relied on participants' self-reported hypothetical species choices or intentions to support a program (Gunnthorsdottir, 2001; Tisdell et al.,

2006), rather than on their actual behaviour (i.e. real money invested). For instance, based on hypothetical species choices and money allocation, Martín-López et al. (2007) found that affect-related factors (e.g. charisma) have more influence on WTP than ecological or scientific considerations. They also found that respondents with better knowledge of biodiversity and greater experience with nature were more willing to donate for the conservation of non-charismatic species that were locally endangered (Martín-López et al., 2007). These results needed to be tested in real-life settings, with actual species valuations.

People also seem to have a preference for conserving animals that are similar to humans (DeKay and McClelland, 1996; Gunnthorsdottir, 2001; Plous, 1993; Samples et al., 1986). The preference among humans for animal species similar to them has been formalized as the Similar Principle Theory (Plous, 1993). This theory is supported by the findings of a research team in Australia, which showed that respondents appeared to favour the survival of mammals rather than birds or reptiles (Tisdell et al., 2006). Another study in the United States showed that physical characteristics (e.g. physical length) were better predictors of government spending decisions for conserving endangered species than more scientific characteristics, such as the level of threat or taxonomic distinctiveness (Metrick and Weitzman, 1996). This prompts the hypothesis that the chances of survival for many species depend

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as much on human preferences as on more biological requirements (e.g. minimum population size).

In this study, we wanted to investigate WTP and its determinants more closely at the individual level, in a situation where money for species conservation is actually given. Among the numerous existing conservation programs, zoological institutions have been involved in both ex-situ (e.g. captive breeding) and in-situ programs (e.g. significant financial contributions to field conservation projects) (Gusset and Dick, 2011). However, the way zoos contribute to conservation is still controversial: for instance, zoos mostly display large-bodied vertebrates and less-threatened species (Balmford et al., 1995; Conde et al., 2011; Fa et al., 2014; Martin et al., 2014). One reason for such bias towards large vertebrates is the general public preference for large mammals and rare or charismatic species in zoos (Angulo et al., 2009; Ward et al., 1998). However, endangered species may not be charismatic, and vice versa, so that the relationship between zoo exhibits and biodiversity preservation can be complex. In any case, more information is needed on public preferences in zoos, and how zoos could integrate such preferences to connect the public with biodiversity preservation.

To support in-situ conservation programs, zoos have developed different strategies to raise money. One of them is the worldwide strategy of “Animal adoption” programs: people can donate a certain amount of money to the zoo; in return, they receive various benefits (e.g. the zoo’s newsletter, meeting zoo keepers, free entrance tickets). In France, participants of such programs are named “god-fathers/mothers” of the animal(s) they chose, whereas they are mostly called “parents” in English speaking countries (e.g. United States). Although there are obviously cultural differences regarding this aspect, we will refer here to participants as “parents”, to adopt a more neutral position. Such programs foster a more intimate and privileged relationship between participants and a particular animal, via its adoptive status, compared to non-participants who visit the zoo. However, emotional responses to animals vary widely between and within taxonomic groups (Myers et al., 2004). For instance, primates are more likely to elicit positive emotional responses, because of their close similarities with humans (Plous, 1993); conversely, invertebrates are expected to elicit more fearful or aversive emotional responses (Kellert, 1993).

Our study therefore aimed to explore people’s willingness-to-pay for species conservation through their actual donations to a zoo animal adoption program, by (1) clarifying whether people consider biological characteristics (e.g. threat level, phylogenetic distance from humans), more affect-related ones (e.g. level of charisma) or the combination of such characteristics in their choice of animal and their willingness-to-pay; (2) assessing whether attitudes towards animals (e.g. emotional responses) are reflected in participants’ support for their conservation; (3) exploring the impact of the donor’s relationship with nature on their choice of an animal and amount of money donated to the program. We assessed these relationships by exploring individual connectedness with nature (Inclusion of Nature in Self, see Schultz, 2001) and childhood experiences of nature (Chawla, 2007) according to how far they spent their childhood in a rural setting.

We are not aware of any previously published research on animal adoption in zoos, despite the relevance of such programs to species conservation. This study therefore makes an important contribution to zoo conservation programs, and will help to clarify the effectiveness of zoo conservation programs in both raising money for field conservation projects and reconnecting people with conservation issues related to endangered species.

Based on previous research findings, we hypothesized (1) that the level of threat and the phylogenetic distance from humans, but also less scientific considerations (e.g. whether the species is charismatic or not) are significant factors in determining the choice of an animal and the amount donated per participant, with larger donations expected for species that are more threatened, more similar to humans and more charismatic; to better understand the impact of the animals’ characteristics, we also looked for interactions among them: for example,

perhaps charisma only matters when species are not endangered, and perhaps it is sufficient for an animal to be either phylogenetically close to humans or charismatic. We also hypothesized (2) that attitudes towards animals (i.e. emotional responses) reflect the support of participants for their conservation; (3) that a stronger sense of connection with nature and more experience of nature during childhood influence respondents’ choices of animal towards species that are less charismatic and less similar to humans.

## 2. Materials and methods

### 2.1. Animal adoption program

The Paris Zoological Park (PZP) opened in 1934, but closed in 2008 for renovation. It reopened in April 2014, as an “immersive” zoo: the 15 ha Park is now divided into five different biozones, where the enclosures are designed to immerse the visitor in the animal’s natural environment. Physical barriers were, as far as possible, either removed or kept out of sight (e.g. glass instead of fences).

In late 2013, the PZP set up an animal adoption program allowing members of the public to adopt one or more animals living in the zoo, for conservation purposes. A list of 29 different named individual animals was proposed (see Table 1), and adopters were free to donate as much money as they wanted. However, six amounts ranging from 15€ to 1000€ were proposed as guidelines, with a sliding scale of benefits offered to the adopter in return. The money donated to the program can be deducted from income tax at a rate of 66% of the amount. The adoption lasts for one year, starting from the day of adoption.

Overall, the raw data from the program we had access to included the following variables for each adoption between December 2013 and February 2015: animal chosen, amount of money donated, participant’s zip code, age, and the date of adoption. Because the program is explicitly presented as supporting in-situ conservation programs, we used the amount of money donated per person for a particular animal as a measure of their willingness-to-pay for the conservation of this species. These raw data represent 10,066 participants in the adoption program.

Secondly, we sent an email to all the program participants to invite them to fill in an online questionnaire, in French, about their experience with the program. We collected data for 6 months (February–September 2015), and received 2134 completed questionnaires, which represents a 21.20% rate of participation in our survey.

### 2.2. Survey instrument

In the survey questionnaire, we investigated the components of the adoption, whether the participants visited the chosen animal in the zoo, the emotions they felt towards this animal in the zoo, and personal information on their relationships with nature (connectedness with nature, concern for biodiversity and how far they spent their childhood in a rural setting), their age and gender.

### 2.3. Components of the adoption

We asked the participants whether they adopted the animal for themselves, for someone else or if they had received it as a gift. We recorded the number of adoptions and animal(s) each participant adopted, as well as the amount of money donated per animal. Finally, we asked the participant to rank nine different possible motivations for the adoption, from 1 – least important reason, to 9 – most important reason. The following nine reasons were listed in random order: “to support the zoo’s conservation mission”, “to support the zoo’s research mission”, “for the benefits”, “for tax relief”, “because I feel a connection with this animal”, “because I like the Paris zoo”, “to contribute to the renovation of the zoo”, “to raise someone’s awareness”, “because the species is endangered”.

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