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## Domesticating the Exotic? An Online Survey of Attitudes towards the International Wildlife Pet Trade

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## Domesticating the Exotic? An Online Survey of Attitudes towards the International Wildlife Pet Trade

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### Abstract

There are a variety of perspectives on wildlife management and conservation, necessitating interdisciplinary research to develop better management strategies. We answered the call to action provided by Teel et al. (2018) to integrate social sciences into conservation and explored an important but understudied issue: views on the international pet-trade of exotic animals. Some pet owners advocate the pet trade as a means to promote conservation, where removing wild animals from their natural habitat could protect them from degraded environments. To gauge how prevalent this attitude is in a cross-national sample, we conducted an online survey that asked 882 participants worldwide to evaluate the pet trade and its relationship with biological conservation. Overall, our survey results showed regional patterns and indicated that younger respondents were more likely to consider international pet trade as a form of acceptable conservation practice compared to older respondents. Education also played a role in shaping views on the pet-trade and indicated that respondents with higher education degrees were less prone to accept pet trade as a substitute for conservation practices. Our research provides novel insights applicable to education programmes and international conservation efforts while highlighting variation in attitudes even among professionals with formal training in natural sciences and ecology.

**Keywords:** interdisciplinary research, conservation biology, social media, exotic pets.

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### INTRODUCTION

The international wildlife trade is an important topic in conservation biology, often examined through field observations, meta-analyses of long-term data and forensic investigations, and regulated by international laws and protection agreements (Chan et al. 2015). International treaties such as the Convention on International Trade in

Endangered Species of Wild Fauna and Flora (CITES) document hundreds of thousands of live animals sold annually within an industry estimated to be worth billions of US dollars per year (Sollund 2013). Such agreements have been instrumental in gauging the size of wildlife exploitation trends and promoting conservation policies. The capture and commerce of live exotic animals for personal ownership, hereafter referred to as *pet trade*, makes up roughly one-fifth of wildlife trade activity (Baker et al. 2013). The pet trade is facilitated by a global movement network within and between continents and it can be detrimental to wildlife conservation, leading to population declines, extirpations, and extinctions (Andreone et al. 2005). For example, a recent threat analysis for Neotropical parrot populations concluded that the pet trade is one of the top reasons for population extirpations and declines (Berkunsky et al. 2017). One of the most enigmatic extirpations is that of Spix's Macaw (*Cyanopsitta spixii*), for which the demand as a pet only increased as it became rarer in the wild (Butchart et al. 2018).

Despite the large scale and impact of the international pet trade, the social component of this activity has received marginal attention and views about what constitutes good practice in wildlife conservation might vary widely across communities and at the global scale (Bennett 2016; Bennett et al. 2017). Moreover, although social-psychological studies informing human attitudes towards conservation have been conducted extensively (St John et al. 2011), there is little information on human perceptions regarding the international pet trade of exotic animals. There are numerous studies that examined attitudes towards wildlife conservation although limited research has been implemented to address the human perception of the exotic pet trade. For example, a study in Nepal found that human attitudes towards the conservation of the red panda (*Ailurus fulgens*) varied with geographic proximity of the survey respondents to protected areas (Sharma et al. 2019), while positive attitudes towards wildlife and protected areas in Ethiopia were found to be associated with higher education (Tessema et al. 2010).

Interestingly, examination of international social media posts from exotic pet owners and field investigations are beginning to reveal that some people may see ownership of exotic animals as a form of biological conservation (Martin et al. 2018; Harrington et al. 2019; Contina et al. 2019). Adherents to this perspective accept removing animals from their natural environments and transferring them into private residences to provide protection from deforestation, pollution, and the adverse consequences of climate change.

We conducted an online survey to examine attitudes regarding the interpretation of pet trade as a conservation approach. We identified patterns in attitudes related to the level of education, age, and country of origin. These findings, although not exhaustive, provide important insights for conservation management and emphasise that to enhance the effectiveness of conservation strategies it is crucial to consider the social dimension of the pet trade (Moorhouse et al. 2017).

## METHODS

### Survey deployment

We conducted an internet-based survey from December 2015 to December 2017 via a self-administered questionnaire created using the kwiksveys.com platform. We disseminated the online survey in Europe, Oceania, Africa, Asia, North, Central, and South America via social media. We posted the survey link on some of the author's personal Twitter and Facebook accounts which was then shared by hundreds of connections, as well as Quick Response codes (QR™) on printed flyers posted at the University of Oklahoma, University of California Los Angeles, University of Michigan, all of which are university campuses in the United States. We also recruited participants by posting our survey link on ECOLOG-L, an online mailing list associated with the Ecological Society of America and hosted at the University of Maryland (<https://listserv.umd.edu/archives/ecolog-l.html>). This mailing list dedicated to ecology and natural science topics has more than 19,000 subscribers worldwide (Inouye pers. comm.).

### Survey questions

The survey included two questions; the first question focused on international trade of exotic species: '*Is the regulated international trade of wildlife an acceptable practice that can help with the conservation effort of certain species when it removes animals from a polluted, over-exploited, or degraded environment, and offers them a safe shelter in a house setting?*'. The second question was: '*If the wild animals are given adequate care, there is nothing wrong in keeping them inside homes as pets. Do you agree with this statement?*'. For both questions participants could choose from one of the following responses: 1) 'Yes'; 2) 'Yes, but it depends on the species'; 3) 'No'. The survey was offered in Spanish and English. Even though the survey was made available to a global audience, we focused on collecting data primarily in the United States and Canada. Spanish translations are available in the survey questionnaire (<http://kwiksveys.com/s/9teF46y8>).

We designed our survey questions to require respondents to consider the underlying trade-offs between environmental or species contexts. Our questions included positively valenced outcome scenarios by affirming that wild animals would be provided with a 'safe shelter' once removed from a degraded environment as stated in question one, and by adding a positive conditional statement worded as 'if the wild animals are given adequate care' included in question two. Therefore, we asked participants to make considerations given a limiting set of conditions similar to prompted responses about behavior presented in other social science research involving scenario planning, message threats, or willingness to pay (Peterson et al. 2003; Martín-López et al. 2007; Miller et al. 2013). Wildlife imperiling scenarios are frequently reported by the news networks, social media, and echoed by global wildlife campaigns promoted by

conservation associations or national governments. Hence, through the inclusion of elements that referred to ‘polluted’, ‘over-exploited’, and ‘degraded environments’, we aimed to create a set of constraints for thinking about wildlife protection as they might be experienced by the respondents in their daily lives (Peterson et al. 2003). We attempted to capture how people across countries, including ecologists, react and interpret conservation measures when challenged by the need (e.g., sense of urgency) of immediate wildlife protection actions.

### Statistical analysis

We explored associations between survey respondents’ age, education level, and geographic origin and their predisposition towards the ‘wildlife trade as an acceptable conservation approach’ through a Chi-squared test in the R package *stats* (R Core Team 2020). We considered the response towards pet trade as a form of conservation approach and investigated its three levels according to the following attitudes: a) ‘Yes’ - in favor of wildlife trade as a form of conservation, b) ‘Depends’ - in favor of wildlife trade as a form of conservation but only for particular species, and c) ‘No’ - against wildlife trade as an acceptable form of conservation. For details on how we collected data on age, education level, and country of origin of the respondents please see the survey questionnaire.

## RESULTS

### Survey findings

A total of 882 participants completed the survey. Most participants originated from North America (N = 696) and Europe (N = 90) although additional responses came from other regions of the world including South and Central America and Asia (N = 46, N = 16, and N = 17, respectively). A complete list of responses is presented in Table 1.

Removing wildlife from their natural environment to be raised as pets was seen as acceptable conservation practice for 564 respondents (63.9%), with 419 respondents (47.5% of the total dataset) stating that this approach would be acceptable only on a case-by-case scenario in relation to the particular species being considered (Table 1). We found an association between participants’ age and attitude towards the international pet trade of exotic animals ( $\chi^2 = 22.7$ ,  $df = 8$ ,  $p = 0.004$ ), with younger respondents more likely to consider the pet trade an acceptable conservation practice than older respondents. Similarly, we found an association between education level of the survey respondents and attitudes toward the international pet trade ( $\chi^2 = 30.8$ ,  $df = 16$ ,  $p = 0.01$ ). Respondents with high school diplomas and bachelor’s degrees appeared more inclined to consider it as an acceptable practice of wildlife protection, while those with postgraduate degrees were less prone to accept wildlife trade. We did not find associations between age and education and respondents’ predispositions toward accepting a direct statement on keeping exotic animals

as house pets ( $\chi^2 = 10.8$ ,  $df = 8$ ,  $p = 0.20$  and  $\chi^2 = 13.9$ ,  $df = 16$ ,  $p = 0.60$ ; respectively). We found no associations between the geographic origin of survey participants and attitudes toward wildlife trade and exotic pets held in captivity ( $\chi^2 = 16.6$ ,  $df = 14$ ,  $p = 0.27$  and  $\chi^2 = 19.2$ ,  $df = 14$ ,  $p = 0.15$ ; respectively).

## DISCUSSION

### Attitudes toward the pet trade

Overall, our findings suggest that attitudes towards the pet trade intended as a form of conservation can be predicted by age and education in agreement with previous studies (Tikka et al. 2000; Sorce et al. 2005). While demographic factors are important in how individuals view wildlife interactions (Hosey and Melfi 2014; Teel and Manfredi 2010), it is likely that survey respondents from specific professional fields (e.g., ecology or related disciplines) might represent the majority of post-graduate people and older people. In other words, the field of study may be driving the survey results, not age or educational level.

While our survey was not comprehensive, it nonetheless brings attention to a controversial aspect of wildlife management: the role of the pet trade in a fast-changing world threatened by anthropogenic change (pollution, habitat degradation, etc.). We found that 29.6% of participants thought it acceptable to keep wild animals as pets if given adequate care, suggesting that pet trade as conservation practice is considered more tolerable when provided in the context of degraded environmental conditions. Our survey also indicates that when individuals are faced with the decision of addressing the environment or addressing single species outcomes, they lean towards the species (Schlegel and Rupf 2010). The percentages of acceptability, even when including species-dependent context, across the two survey questions (e.g., 63.9% and 29.6%, respectively) suggests that respondents were less concerned with species removal from the natural habitat when provided additional constraints of environmental stress. These results are compatible with studies documenting the wide and increasing spread of exotic pet ownership (Lavorgna 2015; Alves et al. 2019).

### Online survey approach: benefits and limitations

Our findings also need to be evaluated in relation to questionnaire dissemination and survey design. As most participants were recruited via social media and natural science-focused email list servers (e.g., ECOLOG-L), it is likely that subscribers were knowledgeable about or interested in wildlife conservation. Therefore, our results suggest that variation in attitudes toward wildlife conservation might be broader than expected, even among professionals in the field of ecology and among people holding advanced degrees.

Moreover, survey responses gathered via email, social media, or through internet services selling low-cost questionnaires (e.g., Amazon Mechanical Turk) can gather

**Table 1**  
**Summary of questionnaire responses. Data collected across age groups, education level, and self-identified country of origin of survey respondents**

	Question 1				Question 2		
	Wildlife trade = acceptable conservation practice				Wildlife trade statement		
		Yes	Depends	No	Yes	Depends	No
	N	responses %	responses %	responses %	responses %	responses %	responses %
<b>Age</b>							
I am between 18 and 25	225	13.3	58.2	28.4	4.4	28.4	67.1
I am between 26 and 30	197	15.7	50.7	33.5	1.5	31.4	67
I am between 31 and 39	213	15.4	45.1	39.4	3.2	19.7	76.9
I am between 40 and 50	129	20.1	36.4	43.4	3.8	27.9	68.2
I am over 50	118	21.1	38.1	40.6	2.5	23.9	73.5
N total participants	882						
<b>Education</b>							
High school	23	26	52.1	21.7	8.6	21.7	69.5
Some college	73	26	54.7	19.1	5.4	28.7	65.7
Associates degree	28	21.4	46.4	32.1	7.1	28.5	64.2
Bachelors degree	298	16.7	49.3	33.8	1.6	29.1	69.1
Masters degree	253	12.6	50.1	37.1	2.7	24.9	72.3
PhD	184	15.2	38	46.7	4	21.8	74.1
MD	5	0	40	60	0	20	80
DVM	8	12.5	62.5	25	12.5	0	87.5
Other	10	30	30	40	0	50	50
N total participants	882						
<b>Geographic origin</b>							
Africa	4	25	75	0	0	25	75
Asia	17	5.8	58.8	35.2	6	23.5	70.5
Central America	16	6.2	50	43.7	0	12.5	87.5
Eastern Europe	5	20	40	40	0	0	100
Europe	90	12.2	38.8	48.8	4.5	20	75.5
North America (USA/Canada)	696	17.8	48.4	33.7	3.2	28.4	68.4
South America	46	13	43.4	43.4	0	56.8	43.2
Oceania	8	0	50	50	0	50	50
N total participants	882						
<b>Total N grouped by response</b>		145	419	318	28	233	621
<b>Total % grouped by response</b>		16.43%	47.51%	36.05%	3.17%	26.41%	70.41%

large quantities of data and offer a relatively quick and inexpensive snapshot of attitudes worldwide (Casler et al. 2013). Thus, even though researchers should carefully consider the tradeoff between the financial costs and the benefits of collecting repeated measures representative of a specific population of interest (Babbie 2020), online surveys can still provide useful information with the caveat that they may require additional steps to ensure quality of the data. For example, it might be necessary to identify the IP addresses of the participants to eliminate duplicate responses, or to record the initial and final timestamp of the questionnaire to filter out answers submitted too quickly to be meaningful (Eysenbach 2004). We also recognise that the online snowball sampling technique might lead to potential skew in analysis although the exact nature of that is difficult to assess because of the anonymity of the collection (Couper and Miller 2008). Nevertheless, the novel approach and results of the present study encourage further and more thorough investigation while offering an insight on some of the ways in

which modern online surveys may help to understand human attitudes characteristic of the Anthropocene.

### Relation to modern conservation biology

A possible explanation for attitudes being skewed toward favorable responses to international pet trade activities might involve the conservation efforts promoted by the zoological gardens of the 21<sup>st</sup> century. Modern zoos are connected with university-level research projects, have developed extensive outreach programmes, and are invested in tangible conservation action plans (Patrick et al. 2007). Indeed, zoos are also popular citizen and tourist attractions, with an estimated number of worldwide visitors to be over 600 million per year (Skibins and Powell 2013). Even though accredited zoos generally discourage engaging in exotic pet trade, unguided zoo visits may result in erroneous understanding of animal biology and their natural habitats (Jensen 2014). It may be that our survey detected at least a partial and unintended effect that

zoos and aquariums across the world have on human attitudes regarding wildlife in captivity.

### The age factor and the younger generations

Our results suggest that the age of the respondents can be a predictor of propensity to accept the pet trade in relation to conservation efforts. Several studies have found age to be correlated with attitudes towards biodiversity and conservation (Young 2005; Lückmann et al. 2013). While additional investigation is needed to understand the exact motivating factors of this finding, we suggest potential factors contributing to the age pattern detected by the survey. The first is that individuals from the ‘Millennial generation’ (i.e., people born after 1980) might be more open to accept controversial practices, such as removing wildlife from their natural environments to ensure survival in captivity, as they perceive an incumbent and irreversible biodiversity loss which they have been exposed to since an early age (Perera and Hewege 2013). Social science literature has captured how early exposure of environmental education media presented at young age can help develop self-identities related to environmental protection that last throughout a lifetime (McGuire 2015). Alternatively, young people may not be fully aware of the threats that international pet trade poses on endangered species and wildlife conservation. This may be a consequence of not experiencing nature directly but rather through remote alternatives such as nature and wilderness videos shared on social media (Barton 2012). Moreover, for younger individuals there may be a certain social status or cachet associated with rare pet ownership akin to the exotic pet trade of the 15<sup>th</sup> and 16<sup>th</sup> centuries (Grigson 2016). In some instances, the two factors may combine to result in the view that wildlife conservation can be carried out in domestic environments. Individuals may consider it important to take any action to help save charismatic wildlife species rather than dwelling on the wider ethical or ecological consequences. The exact mechanism is beyond the scope of the data presented but provides an interesting starting point for future research.

### CONCLUSION

Our research shows variation in attitudes across age and education of the survey respondents, particularly in the U.S. and Canada. It reveals that people’s attitudes might change when exposed to different wildlife threatening scenarios. Future studies will need to recognise that high variation in attitudes towards the international pet trade might exist even within professionals with formal training in the natural sciences and ecology.

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