Conservation impacts and socio-demographic characteristics mediate perceptions of trophy hunting

Luke C. Evans (lukechristopherevans@gmail.com) [1]
Victoria L. Boult (v.l.boult@reading.ac.uk) [1]
Thomas F. Johnson (t.f.johnson@sheffield.ac.uk) [2]

1: Ecology and Evolutionary Biology, School of Biological Sciences, University of Reading, Reading, UK
2: Ecology and Evolutionary Biology, School of Biosciences, University of Sheffield, Sheffield, UK

Correspondence: t.f.johnson@sheffield.ac.uk

Abstract

Trophy hunting is a divisive topic in conservation, with recent events and policy proposals reigniting heated debates over its acceptability. To understand what shapes divergent opinions on trophy hunting, we conducted an opportunistic survey that gauged the degree to which the perceived acceptability of trophy hunting was influenced by a range of contextual factors (e.g. animal welfare, conservation implications). The survey presented respondents with five varying trophy hunting scenarios and asked them to score the acceptability of each. We found a large subset of respondents rejected trophy hunting across all scenarios. We then conducted a two-step analysis, first identifying socio-demographic traits associated with rejection of trophy hunting, finding that older, female respondents choosing a non-meat containing diet and with lower levels of education were more likely to outrightly reject trophy hunting. We then explored contextual parameters of trophy hunting scenarios influencing acceptability among respondents who varied in their scores across scenarios. Here we found that most importance was placed on the conservation impacts of trophy hunting, but that this was balanced amongst animal welfare concerns, economic implications for local communities, and the hunter's motivation to hunt. Our results underline polarisation in the trophy hunting debate, with some respondents rejecting trophy hunting under all scenarios, while for others, the perception of acceptability was contingent on contextual factors. While our survey is only opportunistic, it points to the likely difficulties of reaching a broad consensus over the acceptability of trophy hunting and identifies a necessary caution when interpreting surveys that may implicitly assume a certain ethical framework towards judging the moral acceptability of conservation practices.

Keywords

animal welfare, conservation, ethics, perceptions, social acceptability, socio-cultural, trophy hunting

Introduction

Trophy hunting is a contentious practice which has long ignited impassioned discussions about its acceptability (Baker, 1997). The issue is hotly debated within academia and conservation (Dickman et al., 2019; Horowitz, 2019), but also transcends academia (Mkono, 2023), with debates around the acceptability and function of trophy hunting now frequent on social media (Evans et al., 2023; Hammond et al., 2022), in traditional media (Hart et al., 2020; Macdonald et al., 2016), and in policy (e.g., Hunting Trophy Import (Prohibition) Bill, 2022). At times, these debates are divisive and, at their worst, can include vitriol, abuse, and condemnation (Evans et al., 2023). Such strong reactions reflect deeply entrenched beliefs (Mace, 2014) and often clashes between different value frameworks (e.g. consequentialist vs animal justice perspectives; Ghasemi, 2021; Mkono, 2023; Vucetich et al., 2019), with these differences often expressed more explicitly in academic debate and more implicitly in the public debate.

The acceptability of trophy hunting involves both ethical and empirical dimensions and engages a wide range of stakeholders, leading some to describe it as a "wicked problem" (van Houdt et al., 2021). Disagreements span multiple axes, including whether trophy hunting is a legitimate form of recreation (Bhandari et al., 2006; Woods & Kerr, 2010) or morally reprehensible (Batavia et al., 2019); whether it contributes to conservation or causes ecological harm (Dickman et al., 2019; Lindsey et al., 2007); and whether it supports socioeconomic development (Adhikari et al., 2021; Msigwa et al., 2023) or represents a form of modern-day colonialism (Batavia et al., 2019). These dimensions are often entangled, making it difficult to isolate the specific reasons behind individual stances.

Because public perceptions can shape policy, with potential consequences for the conservation of at-risk species, conservationists and other stakeholders are keen to understand which factors drive those perceptions. A UK-based survey, for example, found that support for a trophy hunting ban decreased when respondents were informed about its potential benefits (Vinogradova, 2021). Similarly, recent work by Hare et al. (2024) shows that views on the acceptability of trophy hunting vary depending on contextual factors such as the species hunted, whether the meat is used, and whether conservation gains are evident. These findings suggest that public attitudes are not fixed by ideology alone, but can reflect pragmatic, case-by-case reasoning—a contrast Hare et al. describe as 'pragmatism' rather than 'dogmatism'.

Breaking down the various factors that shape perceptions of trophy hunting is a productive step towards both improving mutual understanding and guiding empirical inquiry. For example, if impacts on conservation status are a key concern, then generating or communicating stronger evidence on those impacts should be a priority. However, the use of contrasting scenarios to evaluate acceptability implicitly adopts a particular moral framework—namely, a consequentialist one—by presuming that acceptability depends on outcomes rather than on intrinsic values or rights.

In previous work, we examined social media attitudes toward trophy hunting (Evans et al., 2023) and identified distinct 'archetypes' of responses. Some individuals comments exhibited an evidence-based stance consistent with consequentialist ethics (Di Minin et al., 2016), while many others expressed categorical opposition, suggesting moral frameworks grounded in animal rights, justice, or virtue ethics. For those strongly condemning trophy hunting, it was ultimately not clear whether their position stemmed from an empirical evaluation of outcomes or from a belief in the intrinsic rights of hunted animals. Nevertheless, the prevalence of outright rejection suggested that opposition to trophy hunting may be widespread, offering a contrast to the more pragmatically flexible views reported by Hare et al. (2024). These findings underscore the importance of recognising that, for some individuals, moral objections to trophy hunting may not be swayed by evidence of costs or benefits. As such, when evaluating public responses to different scenarios, it is important to remain open to the possibility that consequentialist reasoning may not resonate with those who find the practice morally unacceptable on principle.

Building on these insights, we designed a conceptually similar study to that employed by Hare et al. (2024) to assess factors that impact the public's perception of trophy hunting. Our survey presented respondents with five trophy hunting scenarios and asked them to score the acceptability of each. We first extended the number of axes, compared to Hare et al. (2024), that may influence an individual's decision over the acceptability of trophy hunting in a given scenario. This was based on previous research (Evans et al., 2023) that identified a strong component of personal judgement towards trophy hunters themselves and their behaviour around the hunted animal (e.g., posing for photographs), and strong reactions to the potential for animal suffering (included here as the method of, or weapon used in, hunting). Importantly, we also shaped our analysis to account for outright rejection of trophy hunting. Outright rejection could be key to understanding the dynamics of the trophy hunting debate as it plays out online and in the media, and how, in turn, these debates may inform policy (Males & Van Aelst, 2021). Incorporating this split is also useful from an analytical viewpoint, as those who reject trophy hunting across all scenarios will bias estimates of the

importance of different factors, for those evaluating on a case-by-case basis, towards zero. Or similarly, the importance of the factors will largely reflect the choices of those comfortable with evaluating trophy hunting scenarios on a case-by-case basis. Our design also allowed us to capture inter-individual differences in the average and variance of perceptions of acceptability, alongside assessing socio-demographic predictors of outright rejection of trophy hunting, including gender, level of education, expertise on the topic and diet choice (Cantillo et al., 2025; Gifford & Nilsson, 2014; Godoy, 2020).

We employed a two-stage analysis, separating in the first stage, the demography of those outrightly rejecting trophy hunting and those changing their assessment of acceptability across scenarios — what we term 'rejectors/rejecting' vs 'discriminators/discriminating' (similar to 'dogmatism' and 'pragmatism' respectively in Hare et al. (2024)). In the second stage, we assessed the influence of different parameters on trophy hunting acceptability. In the first stage of analysis, we employed logistic regression to see how these demographic factors predict a binary outcome of either rejection or discrimination across respondents. For discriminating respondents, we then explored how systematically altering different parameters of trophy hunting scenarios influenced perceived acceptability. To evaluate the influence of these factors, we used a custom beta-regression framework which estimated the factors that had the greatest influence on average perceived acceptability, alongside estimating the relationship between variation in acceptability and average acceptability scores across individuals.

Methods

Survey design

To better understand respondents' judgements on the acceptability of trophy hunting, we generated scenarios exploring eight potentially influential factors: (1) impact on the conservation status of the hunted animals' local population, (2) location of the hunt, (3) origin of the hunter, (4) creation of benefits for local communities, (5) protection of habitats from, e.g., conversion to agriculture, (6) welfare of the hunted animal (Macdonald et al., 2016), (7) charisma of the hunted animal (Colléony et al., 2017; Martín-López et al., 2007), and (8) whether the hunter posed for a photo with their trophy (Fischer et al., 2013).

The structure was as follows:

A trophy hunter from [hunter origin: Africa / Europe / North America] hunts and kills a [charisma: species] while on a hunting trip in [hunt location: Africa / Europe / North America]. The hunting of this particular animal was [conservation impact: unlikely / likely] to negatively influence the conservation status of the local population of [charisma: species]. The revenue from the hunt was shared between the [community benefits: landowner and hunting outfitter / landowner, hunting outfitter and local community]. Hunting revenues at this location [habitat protection: do / do not] significantly contribute to maintaining local habitat for wildlife. The hunter used a [welfare: bow / high-powered rifle], which has a relatively [welfare: lower / higher] probability of killing the animal instantly. [photo: end / After the hunt, the hunter posed for a photograph with the body of the hunted animal.]

A full list of hunted species, hunter origins and hunt locations are provided as Supplementary Information.

With a completed example as:

A trophy hunter from Portugal hunts and kills a Rhino in South Africa. The hunting of this particular animal was likely to negatively affect the conservation status of the local population of Rhinos. The

revenue from the hunt was shared between the landowner, a hunting tourism company, and the local community. Hunting revenues at this location do not significantly contribute to maintaining local habitat for wildlife. The hunter used a bow, which has a relatively lower probability of killing the animal instantly. After the hunt, the hunter posed for a photograph with the body of the hunted animal.

This method of scenario generation can result in thousands of combinations, which is challenging to deploy on the surveying software Qualtrics, which we used to share the survey. To produce a manageable range of scenarios, we randomly selected 500 from each hunter origin-hunt location combination and removed any conceptual duplicates (i.e., those where specific countries and species varied, but the implications of the scenarios were essentially the same). This resulted in 160 unique scenarios under the following hunter origin-hunt location combinations:

1) Hunter from Africa, hunting in Africa
2) Hunter from Europe, hunting in Africa
3) Hunter from Europe, hunting in Europe
4) Hunter from North America, hunting in Africa
5) Hunter from North America, hunting in North America

Each regional combination contained 32 scenarios, one of each of which was randomly selected when each respondent began the survey. When presented with a scenario, respondents were asked to rank its acceptability on a continuous integer scale of 0-100, with 0 being unacceptable. We also recorded each respondents' age, location, gender, education level, diet, and self-assessed expertise of trophy hunting. Our sampling approach was opportunistic as we shared the survey through social media channels and email correspondence, with no specific targeting of demographic groups or locations. Consequently, it is important to consider the demographic profile of respondents (see Results) and the limitations this imposes when drawing any general conclusions. Survey responses were collected between 3rd and 22nd March 2023, and came from 304 respondents from 29 countries, spanning all continents except Antarctica.

Modelling: Rejectors vs Discriminators

Our analytic choices were based on prior observations that many people are strongly opposed to trophy hunting and that they may reject it under any scenario described, and second, that there is likely a negative relationship between average perceived acceptability and variance in acceptability even for those discriminating between scenarios (Evans et al., 2023). That is, those whose scores are more consistent across scenarios will likely have low average acceptability scores, whilst those whose scores vary across scenarios will have higher average acceptability scores. This is a consequence of the fact that we expect some people to find trophy hunting to be generally unacceptable across all scenarios and we expect few people to find trophy hunting highly acceptable across all scenarios as this tends to be a rare position in online discussion and in the media. Capturing this relationship would indicate the presence of a less extreme form of rejection of trophy hunting. For example, there may be individuals who think trophy hunting is unacceptable on principle and change acceptability scores only a small amount or not at all, but which nevertheless puts their baseline acceptability above zero.

In the first stage of our analysis, we explored demographic factors that predicted rejection (consistently reject all scenarios as unacceptable) as opposed to discrimination (evaluation resulting in any variation in scores). To do this, we separate those rejecting (1) from those discriminating (0) using a binary indicator. We then applied a logistic regression framework to predict how different demographic factors contributed to the probability of outright rejection of trophy hunting. The high-level overview of this model is:

$logit(U[i]) = age[i] + gender[i] + educational\ level[i] + diet[i] + perceived\ expertise[i]$

A[i] ~ Bernoulli(U[i])

where *i* refers to each individual respondent, *U* to the predicted response on the logit scale, and *A* the indicator of rejection. Demographic information was collected as follows: respondents were asked to input an integer number for their age; for gender, we provided four options (male, female, non-binary / third gender, prefer not to say); respondents were asked to indicate their highest level of education (high school / college or below, bachelors degree, masters degree, doctoral degree, prefer not to say); for diet, we provide five options (vegan, vegetarian, pescatarian, omnivore, carnivore); for self-assessed expertise on trophy hunting, we offered three levels (yes, somewhat, no). To model these data, we reduced the dataset to complete rows and retained only rows where gender was selected as either male or female (we only had 7 responses selecting either of the other categories, preventing the estimation of their effects on the probability of rejecting versus discriminating). We used age as a continuous variable and modelled all other variables as ordered categorical predictors (Bürkner & Charpentier, 2020; McElreath, 2020). Ordered categorical predictors capture the intuition that we expect a consistent direction in the association between ordered levels of a category and our dependent variable (e.g., acceptability increases/decreases with education level), but that we don't necessarily expect changes in the dependent variable to be consistent between levels. This is achieved by estimating a parameter that captures the change in the dependent variable from the lowest reference level to the highest, while also estimating a simplex of parameters (delta 1 to n-1) that describe how each change in level contributes proportionally to this overall change, such that:

$$\beta \sum_{j=1}^{E-1} \delta j$$

Where *β* refers to the difference between the lowest and highest level of the categories, with the total number of categories given as *E*. *δj* then refers to *j* parameters that capture the fraction of this total effect caused by a change from a lower to the next higher category. There are therefore *E-1 δjs* and their values sum to 1. To fit these predictors, we removed rows where responses included "prefer not to say" (n = 4) as they have no natural order relative to other levels.

Modelling: Acceptability

For respondents whom at least one acceptability score was non-zero, we estimated the importance of different factors through a hierarchical beta regression. The components of each of the scenarios presented to the participants were either binary-coded or converted to factor levels with a reference factor level, the exception being charisma, which was continuous. Therefore, changes in the acceptability due to changes in the scenario are measured relative to a baseline scenario of a species with average charisma. Beta regression uses a beta error distribution, the probability density function of which can be defined by two parameters, the mean and precision, indicating the average score and the inverse of the variance of scores, respectively. For example, consistently low scores will give a distribution with a low mean and high precision. The mean is bounded between 0 and 1, while the precision has a lower bound of zero. Values for both can be estimated in separate equations with a logit link for the mean and a log link for precision. As beta regression requires values between 0 and 1, but the probability density function has a log-likelihood of negative infinity (likelihood = 0), at either 0 or 1 we converted our acceptability scores by dividing by 100 (scores were originally on a 0-100 score) and added a small constant (0.001) to scores of 0 or removed it from scores of 1. To account for repeated measures for respondents and the aforementioned expected correlation between mean and precision, we fitted each respondent with an individual intercept for their mean and precision, with these values drawn from a multivariate normal distribution capturing the average mean, precision and

the covariance. A negative correlation between mean and precision, therefore, implies that as the average score increases, the precision increases (variance decreases)

$$A[i,s] \sim beta(u[i,s], \phi[i,s])$$

$$\mu[i,s] = id\mu[i] + hunter\ location[s] + charisma\ species[s] + conservation[s] + benefit\ share[s] + habitat\ protection[s] + weapon[s] + photo[s]$$

$$\phi[i,s] = id\phi[i]$$

$$[id\mu/id\phi] \sim N([\underline{\mu}/\underline{\phi},]\ \Sigma)$$

Where A[i,s] refers to the acceptability of scenario *s* for person *i*. *idμ[i]* refers to the mean baseline acceptability for participant *i* and *idϕ[i]* to the precision of their responses. *idμ* and *idϕ* are drawn from a multivariate normal parameterised with $\underline{\mu}$ and $\underline{\phi}$ the population mean and precision respectively. As we split the data and used an opportunistic sample, we conducted two checks to assess the robustness of the results. First, we re-ran the beta regression with all respondents (rejectors and discriminators), which predicted the same general patterns but some shrinking of effect sizes towards zero and an increase in the correlation between individual intercepts of the mean and precision of acceptability scores (see supplementary markdown in the code repository). Models were fitted in R 4.4.2, rstan 2.32.6 and stan 2.32.2 The stan code for all models is included in the code in repository.

<u>Ethics</u>
The survey design was reviewed and approved by the University of Reading Research Ethics Committee.

Results

We received complete responses from 285 respondents, with only 19 respondents failing to complete the survey. Responses were biased towards the Global North but still covered 29 countries (Figure 1A). Respondents ranged in age from 18 to 88, with a mean age of 42 (Figure 1C). There was an approximately even split of male and female respondents (Figure 1D), with only seven individuals identifying as non-binary / third gender or preferring not to say. Our sample of respondents was well educated, with more than a quarter possessing a doctoral degree (Figure 1E). Omnivory was the most common diet choice, but nearly 100 respondents described themselves as either vegan or vegetarian (Figure 1F). Very few respondents assessed themselves as having expertise in trophy hunting (Figure 1G).

A

B

C

D Gender

E Education

F Diet

G Expertise
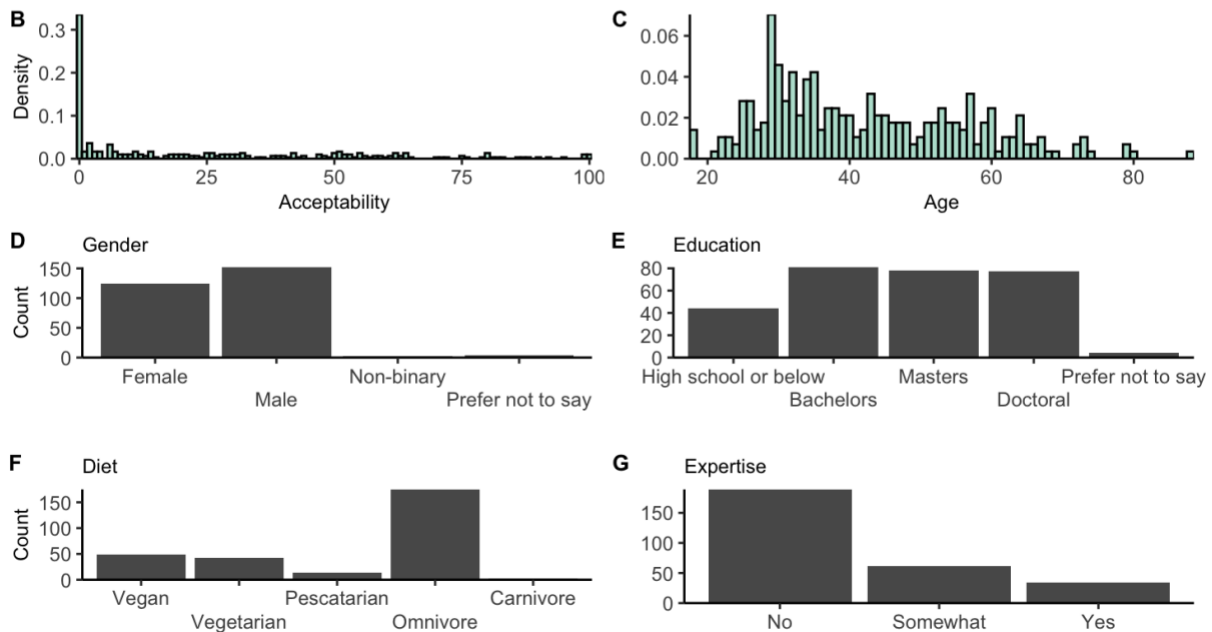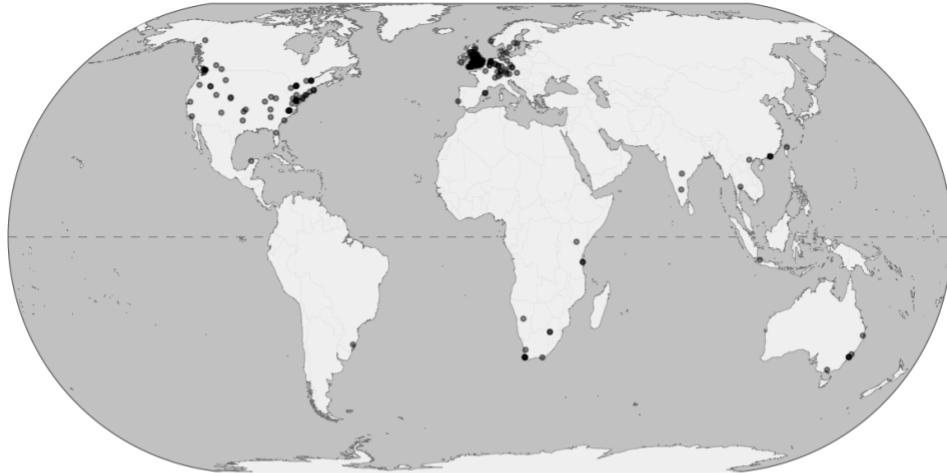
Figure 1. Characteristics of our survey sample, describing the distribution of respondents across space (A), how acceptable respondents view trophy hunting (B; 0 is unacceptable and 100 is acceptable), as well as the breakdown of respondents by age (C), gender (D), education (E), diet (F) and self-reported trophy-hunting expertise (G).

Respondents' perceptions on the acceptability of trophy hunting were highly skewed, with more than a third of respondents rejecting trophy hunting in all five scenarios (n = 95; 178 individuals did not reject trophy hunting in every scenario. Figure 1B). The probability of respondents outrightly rejecting trophy hunting (scoring zero acceptability in all five scenarios) was linked to demographic traits (Figure 2). Respondents who were young, male, highly educated, or chose a meat-containing diet were more likely to be discriminators. Conversely, respondents who were older, female, choosing a vegan or vegetarian diet, or without an advanced degree were more likely to reject trophy hunting. Respondents' self-identified expertise on trophy hunting was the only factor without an effect at 95% credibility intervals. Comparing the time taken to complete the survey revealed that outright rejectors (211 seconds) finished the survey in significantly (t = 5.6, df = 261, p-value < 0.001) less time than evaluators (321 seconds).
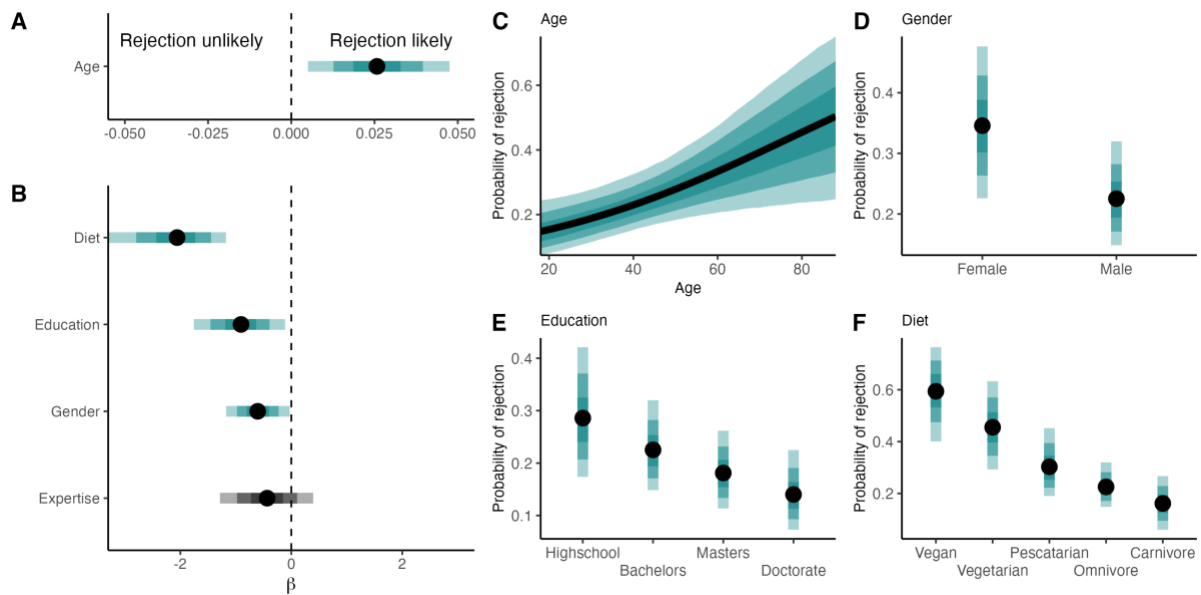
Figure 2. Associations between demographics and the probability of rejecting trophy hunting scenarios i.e. scoring the acceptability as zero in all five scenarios and thus showing a reluctance to change their stance regardless of being presented with new information. We report fixed-effect coefficients from a logistic model for continuous (A) and ordinal (B) covariates. Marginal effects are presented for each effect not overlapping zero at 95% credible intervals (C-F; also coloured in teal). Points represent the median estimate, shaded error bars describe the following credible intervals: 50%, 80%, and 95%.

Considering only respondents falling within the discriminator group (answered non-zero to at least one scenario, n = 178), we used correlative models to explore how views on the acceptability of trophy hunting changed as scenario parameters varied (Figure 3). Trophy hunting was considered more acceptable if hunting was unlikely to have a negative impact on the local conservation status of the species, if hunting revenues supported habitat protection and were shared with local communities, and where high-powered rifles were used as opposed to bows. Trophy hunting was considered less acceptable when hunters originated from outside the region in which the hunt took place and when hunters posed for a photo with the trophy. The charisma of the species hunted had no impact on acceptability. The majority of the variation (52%) in acceptability was captured by the respondent random intercept-term, with fixed effects (i.e. the different scenarios) accounting for only 16% of the variation in the sample: Conditional R^2 = 0.68, Marginal R^2 = 0.16
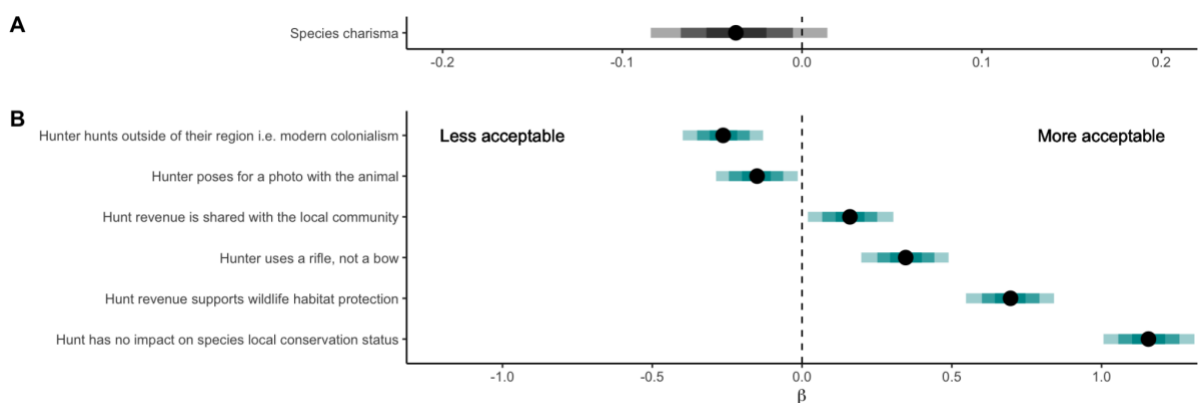
Figure 3. Exploration of how perceptions of trophy hunting acceptability changed as scenario parameters were adjusted. We report fixed-effect coefficients from a beta regression (mean parameter, not variance) for

continuous (A) and binary (B) covariates. Effects not overlapping zero at 95% credible intervals are coloured in teal. Points represent the median estimate, shaded error bars describe the following credible intervals: 50%, 80%, and 95%.

Discussion

Our study reveals complexity in how people respond to trophy hunting across different scenarios. Over a third of respondents rejected trophy hunting across all scenarios, regardless of the varying species identity, hunter nationality, hunt location, and the impacts on conservation, socio-economic development and animal welfare. Socio-demographics, however, did vary between the rejectors and discriminators, with rejectors more likely to be older, female, follow a non-meat consuming diet, and not to hold an advanced degree. For those who discriminated between scenarios, we found that acceptability was influenced by wide selection of features, most notably, trophy hunting was considered more acceptable if the hunt did not impact the local conservation status of the species. Our results support some aspects of earlier work from Hare et al. (2024), who concluded that there was a high degree of 'pragmatism' (our discriminators), as we find a majority discriminated across scenarios. However, our results differ in that we identify a sizeable minority who rejected trophy hunting outright. We first discuss our results before supplying potential reasons for differences with Hare et al (2024). We close by considering the wider conservation implications of our results, and exploring how divisive conservation practices 'play out' in the public sphere.

Demographics of rejectors vs discriminators

We found those rejecting trophy hunting were more likely to be older, female, follow a non-meat consuming diet, and not to hold an advanced degree. Similar results have been found elsewhere, including declining support for trophy hunting with age (MacKay & Campbell, 2004), amongst females (Cornish et al., 2018; Herzog et al., 1991; Kellert & Berry, 1987; Randler et al., 2021), vegans (Lund et al., 2016; Randler et al., 2021), and those with a lower educational status (Hare et al., 2024). A limitation of our survey is that the grounds on which our survey respondents outrightly rejected trophy hunting are unknown — as they showed no variation in scores across scenarios. However, we can posit possible reasons based on existing literature.

Gender has been identified as a major demographic determinant of attitudes towards wildlife and conservation, with women often showing greater aversion to animal exploitation relative to men (Kellert & Berry, 1987), while belief in animal sentience and concern for animal welfare has also been found to be more prevalent in women (Cornish et al., 2018; Herzog et al., 1991; Randler et al., 2021). Consequently, female respondents may be more likely to judge scenarios from a perspective of animal rights/justice, deeming the act of trophy hunting, which ultimately amounts to the hunting of animals to obtain a trophy, as unacceptable on principle. Alternatively, eco-feminist perspectives propose a connection between the hunting of animals and the domination of women (Baralt et al., 2004; Godoy, 2020; Kalof & and Fitzgerald, 2003), such that the objection to trophy hunting may also reflect a rejection of female oppression.

Explanations for the impacts of diet and age are similar. Diet has been demonstrated as a strong determinant of animal welfare attitudes (Lund et al., 2016; Randler et al., 2021), particularly vegans showing more concern for animal welfare and interest in animal rights than omnivores (Lund et al., 2016; Randler et al., 2021). There is also some evidence to suggest that objection towards trophy hunting amongst older individuals stems from increasing concerns for animal sentience (Cornish et al., 2018) or individuals becoming more conservative and less environmentally-oriented (Mah et al., 2020) with age. Objections derived from animal sentience are likely to view trophy hunting as unacceptable and a threat to animal welfare. This may combine with a decline in environmental concern to place little to no value in the potential benefits of trophy hunting for conservation, while also rejecting it based on considerations of animal rights and welfare.

Finally, education has repeatedly been found to correlate positively with pro-environmental behaviours (Meyer, 2015) and could thus explain why outright rejection of trophy hunting decreased with educational level as those more educated may put more weight on the potential conservation benefits of trophy hunting. Alternatively, those with less education may be more likely to evaluate the acceptability of trophy hunting from an animal rights/welfare perspective. For example, in popular media, animals are often anthropomorphised or 'personalised' (Somerville et al., 2021) and in many situations where members of the public interact or engage with conservation topics (e.g. at zoos and charitable organisations) there is often a focus on individual and charismatic animals. This focus on individuals may lend itself naturally to people evaluating conservation topics through a lens on individual rights and welfare.

The only factor found not to influence whether respondents outrightly rejected trophy hunting was their self-identified expertise on the subject. We predicted that those with more expertise on the subject would be more likely to discriminate between the scenarios, as they were expected to be more aware of arguments around the purported benefits of trophy hunting, even if they dispute or disagree with them. However, self-identification of expertise is complicated. For example, the Dunning-Kruger effect describes a phenomenon where unskilled individuals tend to overestimate their expertise (they are ignorant of their ignorance), while experienced individuals underestimate (they are more aware of what they do not know) (Kruger & Dunning, 1999) and self-identified expertise intersects with socio-demographic factors (Adamecz et al., 2025). Consequently, we found no evidence that self-identified expertise influenced the probability of discrimination and rejection, though expertise may interact with other factors making it difficult to identify an effect in this case.

Factors influencing acceptability

For respondents who discriminated between trophy hunting scenarios, acceptability depended on conservation impact, the protection of natural habitat, weapon choice, revenue distribution, the origin of the hunter in relation to the location of the hunt, and whether the hunter posed for a photo with their trophy. Our results support those of Hare et al. (2024): trophy hunting was deemed more acceptable when revenue was used to support conservation (allied to our variables on the impact on conservation status and habitat protection) and when meat from the hunt was shared with local communities (similar to the sharing of revenues with local communities). The only disagreement we note is the influence of species' charisma: Hare et al. (2024) found that hunting of zebra (less charismatic) was deemed more acceptable than hunting of an elephant (more charismatic), while we found no effect of charisma (across a greater range of species).

We included weapon choice in our scenarios to allude to the animal welfare associated with the hunt, with animals hunted with bows likely to suffer wounding but not death more frequently than those hunted with high-powered rifles (Nixon et al., 2001). It is likely therefore that the influence of weapon choice on acceptability was linked to respondents' concerns for animal welfare.

We further designed five combinations of hunter origin and hunt location to understand how perceptions of acceptability may be influenced by the concept of North Americans and Europeans hunting outside of their own region. This follows an emerging discourse in which some have likened trophy hunting by North Americans and Europeans in sub-Saharan Africa to modern-day colonialism (Batavia et al., 2019; Mkono, 2019; Sullivan, 2023). The involvement of North Americans and Europeans in wildlife conservation and socio-economic development in the Global South has more broadly been criticised as white saviourism and helicopter science (Tan, 2021; Winston, 2010). This likely explains why we saw scenarios in which North Americans and Europeans hunted in Africa were perceived as less acceptable than those in which hunters hunted in their region of origin.

Finally, the inclusion of whether or not the hunter posed for a photo with their trophy suggested some relevance of the hunter's motivation and character. We have noted that people posing with photos of hunted animals often elicit extremely strong condemnation on social media with people often directing criticism towards the hunter (Evans et al. 2023). From a utilitarian perspective, or even one of animal welfare, whether a photo is taken after the animal has been hunted is largely incidental. But our results suggest that, even for those taking a somewhat utilitarian approach to judging trophy hunting (i.e. discriminators), the behaviour of the hunter towards the animal after death affects the perceived acceptability of the scenario. Motivation to hunt has been found to be a primary driver for evaluating whether or not a hunt was acceptable (Fischer et al., 2013). We argue that posing for a photo reinforces that for the hunter, the primary goal of the hunt was the trophy, and not for the potential conservation or socio-economic benefits. Hunters posing with the photo may also spark distaste associated with a hunter's desire to dominate, as suggested by eco-feminism theory (Littlefield, 2010), but may also relate to broader social norms around the treatment of the dead. Analogous to military codes that prohibit photographing or posing with deceased combatants, posing for photos may be perceived as violating implicit expectations of dignity and restraint. Even when the killing of an animal is judged acceptable on utilitarian or conservation grounds, overt displays of enjoyment or dominance may shift the act from necessity to spectacle, thereby eliciting greater moral condemnation of the hunt and the hunter

Our respondents placed the most weight on the conservation parameters of a hunt (impacts on conservation status and habitat protection). Animal welfare (weapon choice) and aspects that suggest colonialism (whether the hunter was hunting outside of their origin region) were similarly important, as were socio-economic outcomes (revenue sharing) and the hunter's motivation (photo) (Figure 3). This suggests that discriminating respondents were primarily driven by conservation impacts when determining the acceptability of a trophy hunting scenario. Further, benefits to local communities were less important than ensuring individual animal welfare, and scenarios suggesting a colonial trope were more distasteful than those in which the hunter's primary motivation was for the trophy (i.e. being photographed).

Points of difference with Hare et al., 2024

Our study includes features similar to those of Hare et al. (2024), though we draw different conclusions. Consequently, it is useful to evaluate reasons underlying these differences. One difference is that we find a substantial minority of respondents reject trophy hunting under all scenarios, and that these 'rejectors' are predictable based on demographic traits which suggest perspectives driven by concerns for animal welfare and rights. This contrasts with Hare et al. (2024) who conclude that people are 'pragmatic' in their opinion of trophy hunting, but is consistent with Evans et al. (2023), where many online comments around trophy hunting were grouped into rejecting 'archetypes'.

This differences between our study and Hare et al. (2024) likely stem from differences in study design, analysis, and deployment. First, Hare et al. (2024) presented each respondent with one scenario and assessed how manipulated factors within the scenario influenced acceptability i.e. Hare et al. (2024) report variability in acceptability *between* respondents. In contrast, we presented each respondent with five different scenarios, and assessed how not only the manipulated factors within the scenario influenced acceptability, but also, how average acceptability varied between respondents i.e. this allowed us to assess how much acceptability varied *within* and *between* people. We believe this repeated measures approach is key to assessing '*pragmatism*'/discrimination, as we can assess how willing people are to change their stance on trophy hunting when presented with new information, instead of reporting how much acceptability varies across the statistical population, as in Hare et al. (2024). In our results, we found that the majority of the variation (52%) in our sample was captured by the respondent random intercepts, with the fixed effects capturing 16% of variation, and the residuals

capturing 32%. This suggests that, whilst people are willing to adapt their stance when confronted with new information, there is also a substantial rigidity and inflexibility to discriminate within our sample. There are of course, exceptions to the rule – 12 of our respondents changed their acceptability from 0 to 100 (or vis versa) within the five scenarios highlighting a stark willingness to adjust their stance. This is however a minority compared to the 106 (95 of which specified acceptability as zero) respondents that maintained a consistent acceptability throughout the five scenarios. All things considered, we find that discrimination (or 'pragmatism') is not widespread within our sample.

Second, both surveys, ours and Hare et al's (2024), implicitly assume a utilitarian framing, such that sources of variation in acceptability derive from a weighing of costs and benefits across different scenarios. However, past work has suggested that many respondents would reject trophy hunting outright (Evans et al., 2023). With this in mind, we first ensured each respondent received five district scenarios which allowed us to separate rejectors from rejected scenarios. We then employed a two-stage analysis to separate 'rejectors' from 'discriminators', before evaluating how different factors influence acceptability. Without the two stages of analysis, we found that the effect sizes shrank closer to zero when including the whole sample (rejectors and discriminators), when in fact there are two distinct clusters of respondents. Additionally, in following general advice to remove surveys completed too quickly or those including repetitive responses to eliminate poor quality data (Wardropper et al., 2021), Hare et al. (2024) may have inadvertently removed relevant information, as respondents rejecting trophy hunting on moral grounds will likely complete the survey quickly and with uniform responses. While such responses may not provide information of interest to the survey (e.g., what factors most influence opinion), they nevertheless provide useful data on general opinion around the acceptability of trophy hunting.

We also find differences in the weighting of factors influencing the perceived acceptability of trophy hunting between our study and that of Hare et al. (2024). This may be due to differences in phrasing or sampling procedures. Hare and colleagues adopted a more robust sampling approach, utilising quota sampling to balance the demographic traits of respondents. Our survey was instead, opportunistic. We shared the survey via social media and email, and thus our results are likely much less representative of wider public opinion. That conservation implications were weighted most strongly in our survey reflects the large proportion of respondents with advanced degrees, likely in conservation and related subjects given that our networks as conservation biologists inevitably contain a relatively high number of conservation-minded individuals (Luque-Lora et al., 2022; van Houdt et al., 2021). This may also explain the lack of influence of species' charisma, as conservationists typically place greater value in, e.g., a species' contribution to ecosystem function, rather than charisma. That benefits to local communities were less influential than animal welfare concerns was surprising, and potentially reflects the underrepresentation of respondents from the Global South, who are more aware of the costs of living alongside wildlife. Our results, and differences from those of Hare et al. (2024), must therefore be interpreted in light of our opportunistic sampling approach.

Wider conservation implications

Our study provides illuminating evidence on the factors influencing individuals' perceptions of trophy hunting. A pronounced proportion of respondents reject trophy hunting under all scenarios, steadfastly viewing trophy hunting as morally unacceptable, irrespective of contextual information. Rejecting is socio-demographically determined, and influential traits associated with rejectors suggest that outright moral objection to trophy hunting is potentially driven by concerns for animal rights and the undervaluing of possible environmental benefits.

This ultimately has wider implications for conservation. The 21st century move towards evidence-based conservation (Sutherland et al., 2004) as a means to guide decision making and improve conservation outcomes may be ineffective in convincing individuals who outrightly reject a given conservation practice on moral grounds. This certainly has implications for trophy hunting (Evans et al., 2023), but is also likely to play into other divisive conservation debates including rewilding, reintroduction, invasive species management, and ex situ conservation. As scientists, moral reasoning is often overlooked, clearly demonstrated by the survey we present here and that of Hare et al. (2024); both inherently assume a consequentialist approach to determining the acceptability of trophy hunting (weighing of costs and benefits). Our results reveal a large proportion of people who object to trophy hunting on moral grounds and are likely therefore to be unreceptive to evidence-based reasoning. This presents conservation scientists with a dilemma if we wish to influence public perception and policy, and it will be important to look for alternative approaches.

References

Adamecz, A., Ilieva, R., & Shure, N. (2025). *Revisiting the Dunning-Kruger Effect: Composite Measures and Heterogeneity by Gender*.

Adhikari, L., Khan, B., Joshi, S., Ruijun, L., Ali, G., Shah, G. M., Ismail, M., Bano, K., Ali, R., Khan, G., Pasakhala, B., & Ali, A. (2021). Community-based trophy hunting programs secure biodiversity and livelihoods: Learnings from Asia's high mountain communities and landscapes. *Environmental Challenges*, 4, 100175. https://doi.org/10.1016/j.envc.2021.100175

Baker, J. E. (1997). Trophy Hunting as a Sustainable Use of Wildlife Resources in Southern and Eastern Africa. *Journal of Sustainable Tourism*, 5(4), 306–321. https://doi.org/10.1080/09669589708667294

Baralt, L., Kalof, L., & Fitzgerald, A. (2004). Animals, Women, and Weapons: Blurred Sexual Boundaries in the Discourse of Sport Hunting. *Society & Animals*, 12(3), 237–251. https://doi.org/10.1163/1568530042880695

Batavia, C., Nelson, M. P., Darimont, C. T., Paquet, P. C., Ripple, W. J., & Wallach, A. D. (2019). The elephant (head) in the room: A critical look at trophy hunting. *Conservation Letters*, 12(1), e12565. https://doi.org/10.1111/conl.12565

Bhandari, P., Stedman, R. C., Luloff, A. E., Finley, J. C., & Diefenbach, D. R. (2006). Effort versus Motivation: Factors Affecting Antlered and Antlerless Deer Harvest Success in Pennsylvania. *Human Dimensions of Wildlife*, 11(6), 423–436. https://doi.org/10.1080/10871200600984422

Bürkner, P.-C., & Charpentier, E. (2020). Modelling monotonic effects of ordinal predictors in Bayesian regression models. *British Journal of Mathematical and Statistical Psychology*, 73(3), 420–451. https://doi.org/10.1111/bmsp.12195

Cantillo, J., Astorino, L., & Tsana, A. (2025). Determinants of pro-environmental attitude and behaviour among European Union (EU) residents: Differences between older and younger generations. *Quality & Quantity*. https://doi.org/10.1007/s11135-025-02089-8

Colléony, A., Clayton, S., Couvet, D., Saint Jalme, M., & Prévot, A.-C. (2017). Human preferences for species conservation: Animal charisma trumps endangered status. *Biological Conservation*, *206*, 263–269. https://doi.org/10.1016/j.biocon.2016.11.035

Cornish, A., Wilson, B., Raubenheimer, D., & McGreevy, P. (2018). Demographics Regarding Belief in Non-Human Animal Sentience and Emotional Empathy with Animals: A Pilot Study among Attendees of an Animal Welfare Symposium. *Animals*, *8*(10), 174. https://doi.org/10.3390/ani8100174

Di Minin, E., Leader-Williams, N., & Bradshaw, C. J. A. (2016). Banning Trophy Hunting Will Exacerbate Biodiversity Loss. *Trends in Ecology & Evolution*, *31*(2), 99–102. https://doi.org/10.1016/j.tree.2015.12.006

Dickman, A., Cooney, R., Johnson, P. J., Louis, M. P., Roe, D., & 128 signatories. (2019). Trophy hunting bans imperil biodiversity. *Science*, *365*(6456), 874–874. https://doi.org/10.1126/science.aaz0735

Evans, L. C., Greenwell, M. P., Boult, V. L., & Johnson, T. F. (2023). Characterizing the trophy hunting debate on Twitter. *Conservation Biology*, *37*(4), e14070. https://doi.org/10.1111/cobi.14070

Fischer, A., Kereži, V., Arroyo, B., Mateos-Delibes, M., Tadie, D., Lowassa, A., Krange, O., & Skogen, K. (2013). (De)legitimising hunting – Discourses over the morality of hunting in Europe and eastern Africa. *Land Use Policy*, *32*, 261–270. https://doi.org/10.1016/j.landusepol.2012.11.002

Ghasemi, B. (2021). Trophy hunting and conservation: Do the major ethical theories converge in opposition to trophy hunting? *People and Nature*, *3*(1), 77–87. https://doi.org/10.1002/pan3.10160

Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, *49*(3), 141–157. https://doi.org/10.1002/ijop.12034

Godoy, E. (2020). Sympathy for Cecil: Gender, trophy hunting, and the western environmental imaginary. *Journal of Political Ecology*, *27*(1). https://doi.org/10.2458/v27i1.23526

Hammond, N. L., Dickman, A., & Biggs, D. (2022). Examining attention given to threats to elephant conservation on social media. *Conservation Science and Practice*, *4*(10), e12785. https://doi.org/10.1111/csp2.12785

Hare, D., Dickman, A. J., Johnson, P. J., Rono, B. J., Mutinhima, Y., Sutherland, C., Kulunge, S., Sibanda, L., Mandoloma, L., & Kimaili, D. (2024). Public perceptions of trophy hunting are pragmatic, not dogmatic. *Proceedings of the Royal Society B: Biological Sciences*, *291*(2016), 20231638. https://doi.org/10.1098/rspb.2023.1638

Hart, A. G., Cooney, R., Dickman, A., Hare, D., Jonga, C., Johnson, P. K., Louis, M. P., Lubilo, R., Roe, D., Semcer, C., & Somerville, K. (2020). Threats posed to conservation by media misinformation. *Conservation Biology*, *34*(6), 1333–1334. https://doi.org/10.1111/cobi.13605

Herzog, H. A., Betchart ,Nancy S., & and Pittman, R. B. (1991). Gender, Sex Role Orientation, and Attitudes toward Animals. *Anthrozoös*, *4*(3), 184–191. https://doi.org/10.2752/089279391787057170

Horowitz, A. (2019). Trophy hunting: A moral imperative for bans. *Science*, *366*(6464), 435–435. https://doi.org/10.1126/science.aaz3315

Kalof, L., & and Fitzgerald, A. (2003). Reading the trophy: Exploring the display of dead animals in hunting magazines. *Visual Studies*, *18*(2), 112–122. https://doi.org/10.1080/14725860310001631985

Kellert, S. R., & Berry, J. K. (1987). Attitudes, Knowledge, and Behaviors toward Wildlife as Affected by Gender. *Wildlife Society Bulletin (1973-2006)*, *15*(3), 363–371.

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, *77*(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Lindsey, P. A., Roulet, P. A., & Romañach, S. S. (2007). Economic and conservation significance of the trophy hunting industry in sub-Saharan Africa. *Biological Conservation*, *134*(4), 455–469. https://doi.org/10.1016/j.biocon.2006.09.005

Littlefield, J. (2010). Men on the hunt: Ecofeminist insights into masculinity. *Marketing Theory*, *10*(1), 97–117. https://doi.org/10.1177/1470593109355250

Lund, T. B., McKeegan ,Dorothy E. F., Cribbin ,Clare, & and Sandøe, P. (2016). Animal Ethics Profiling of Vegetarians, Vegans and Meat-Eaters. *Anthrozoös*, *29*(1), 89–106. https://doi.org/10.1080/08927936.2015.1083192

Luque-Lora, R., Keane, A., Fisher, J. A., Holmes, G., & Sandbrook, C. (2022). A global analysis of factors predicting conservationists' values. *People and Nature*, *4*(5), 1339–1351. https://doi.org/10.1002/pan3.10391

Macdonald, D. W., Jacobsen, K. S., Burnham, D., Johnson, P. J., & Loveridge, A. J. (2016). Cecil: A Moment or a Movement? Analysis of Media Coverage of the Death of a Lion, Panthera leo. *Animals*, *6*(5), Article 5. https://doi.org/10.3390/ani6050026

Mace, G. M. (2014). Whose conservation? *Science*, *345*(6204), 1558–1560. https://doi.org/10.1126/science.1254704

MacKay, K. J., & Campbell, M. J. (2004). An examination of residents' support for hunting as a tourism product. *Tourism Management*, *25*(4), 443–452. https://doi.org/10.1016/S0261-5177(03)00127-4

Mah, A., Matsuba, M. K., & Pratt, M. W. (2020). The politics behind environmentalism: How political ideological development in emerging adulthood may play a role. *Journal of Environmental Psychology*, *69*, 101417. https://doi.org/10.1016/j.jenvp.2020.101417

Males, J., & Van Aelst, P. (2021). Did the Blue Planet set the Agenda for Plastic Pollution? An Explorative Study on the Influence of a Documentary on the Public, Media and Political Agendas. *Environmental Communication*, *15*(1), 40–54. https://doi.org/10.1080/17524032.2020.1780458

Martín-López, B., Montes, C., & Benayas, J. (2007). The non-economic motives behind the willingness to pay for biodiversity conservation. *Biological Conservation*, *139*(1), 67–82. https://doi.org/10.1016/j.biocon.2007.06.005

McElreath, R. (2020). *Statistical Rethinking: A Bayesian Course with Examples in R and STAN* (2nd ed.). Chapman and Hall/CRC. https://doi.org/10.1201/9780429029608

Mkono, M. (2019). Neo-colonialism and greed: Africans' views on trophy hunting in social media. *Journal of Sustainable Tourism*, *27*(5), 689–704. https://doi.org/10.1080/09669582.2019.1604719

Mkono, M. (2023). How we can make the trophy hunting debate less fraught. *Nature Human Behaviour*, *7*(1), 6–8. https://doi.org/10.1038/s41562-022-01488-3

Msigwa, F., Mombo, F. M., Brehony, P., & Kimaro, M. (2023). *Trophy Hunting in Tanzania's Rungwa Game Reserve: A Socioeconomic Evaluation of Benefits and Cost*. SSRN. https://doi.org/10.2139/ssrn.4547074

Nixon, C. M., Hansen, L. P., Brewer, P. A., Chelsvig, J. E., Esker, T. L., Etter, D., Sullivan, J. B., Koerkenmeier, R. G., & Mankin, P. C. (2001). Survival of white-tailed deer in intensively farmed areas of Illinois. *Canadian Journal of Zoology*, *79*(4), 581–588. https://doi.org/10.1139/z01-010

Randler, C., Adan, A., Antofie, M.-M., Arrona-Palacios, A., Candido, M., Boeve-de Pauw, J., Chandrakar, P., Demirhan, E., Detsis, V., Di Milia, L., Fančovičová, J., Gericke, N., Haldar, P., Heidari, Z., Jankowski, K. S., Lehto, J. E., Lundell-Creagh, R., Medina-Jerez, W., Meule, A.,

… Vollmer, C. (2021). Animal Welfare Attitudes: Effects of Gender and Diet in University Samples from 22 Countries. *Animals*, *11*(7), Article 7. https://doi.org/10.3390/ani11071893

Somerville, K., Dickman, A., Johnson, P.J. and Hart, A.G., 2021. Soap operas will not wash for wildlife. *People and Nature*, *3*(6), pp.1160-1165.

Sullivan, S. (2023). 'Hunting Africa': How international trophy hunting may constitute neocolonial green extractivism. *Journal of Political Ecology*, *30*(1). https://doi.org/10.2458/jpe.5489

Sutherland, W. J., Pullin, A. S., Dolman, P. M., & Knight, T. M. (2004). The need for evidence-based conservation. *Trends in Ecology & Evolution*, *19*(6), 305–308. https://doi.org/10.1016/j.tree.2004.03.018

Tan, K.-C. (2021). Just conservation: The question of justice in global wildlife conservation. *Philosophy Compass*, *16*(2), e12720. https://doi.org/10.1111/phc3.12720

van Houdt, S., Brown, R. P., Wanger, T. C., Twine, W., Fynn, R., Uiseb, K., Cooney, R., & Traill, L. W. (2021). Divergent views on trophy hunting in Africa, and what this may mean for research and policy. *Conservation Letters*, *14*(6), e12840. https://doi.org/10.1111/conl.12840

Vinogradova, K. (2021). Conflicting attitudes around the trophy hunting ban. *Survation*. https://www.survation.com/conflicting-attitudes-around-the-trophy-hunting-ban/

Vucetich, J. A., Burnham, D., Johnson, P. J., Loveridge, A. J., Nelson, M. P., Bruskotter, J. T., & Macdonald, D. W. (2019). The value of argument analysis for understanding ethical considerations pertaining to trophy hunting and lion conservation. *Biological Conservation*, *235*, 260–272. https://doi.org/10.1016/j.biocon.2019.04.012

Wardropper, C. B., Dayer, A. A., Goebel, M. S., & Martin, V. Y. (2021). Conducting conservation social science surveys online. *Conservation Biology*, *35*(5), 1650–1658. https://doi.org/10.1111/cobi.13747

Winston, T. P. (2010). *A Critique of the Environmental Savior Trope in Wildlife Film*. Montana State University.

Woods, A., & Kerr, G. (2010). *Recreational game hunting: Motivations, satisfactions and participation* (No. 18; Land Environment and People Research, pp. 1–55). Lincoln University. https://researcharchive.lincoln.ac.nz/server/api/core/bitstreams/4e2214c9-ba7c-4a1d-a410-26cc2b62feff/content