Divergent views on trophy hunting in Africa, and what this may mean for research and policy

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Abstract
Over the past decade, trophy hunting in Africa has seen increased public and scientific interest. Much of that attention has come from outside of Africa, with little emphasis on local views. We circulated an online survey through international networks to explore demographic and regional differences in opinion regarding support for African trophy hunting, trophy import bans, and outside funding of conservation estates supported by hunting. We received ~5700 responses and found that location, demography, and conservation background influenced opinion. African and North American respondents showed (significantly) more support for trophy hunting than respondents from Europe or other areas, as did respondents with conservation backgrounds. Unlike North Americans, Africans supported external subsidies of wildlife areas presently funded by hunting. Many factors affected opinions on African hunting, but respondent location played a major role. Realistic policy on African trophy hunting should thus integrate African perspectives, in particular those of rural communities.

KEYWORDS
Africa, community-based conservation, conservation aid, conservation policy, trophy hunting, wildlife management

1 | INTRODUCTION
There has been much debate over the past few years around trophy hunting in sub-Saharan Africa. This has led to urgent outside appeals to stop hunting in Africa (Horowitz, 2019), renewed interest in certification (Wanger et al., 2017), and calls for international funding of Africa’s wildlife estates (Lindsey et al., 2016).
Despite outside appeals to stop African hunting, many conservation scientists have outlined the deleterious conservation outcomes of bans (see Dickman et al., 2019). The conservation backing for hunting stems from a concern about the longevity of wildlife estates, and the flora and fauna therein (Di Minin et al., 2016). Land that supports wildlife populations in Africa is land that could be used by subsistence farmers, who consequently suffer an opportunity cost (Muposhi et al., 2016). The same people further endure the costs of human–wildlife conflict (Matseketsa et al., 2019). Conservation in Africa is unlikely to be sustainable unless these imbalances are compensated (Sibanda, 2015).

Legal hunting provides income for community-based conservation efforts (Taylor, 2009) and provides meat to poor rural communities (Naidoo et al., 2016). Well-managed hunting concessions may prevent, or slow deforestation (Young et al., 2020). Biologists who support hunting base their views on the complexity of the challenges facing conservation in Africa; large mammal populations, in particular, are in decline through habitat loss, illegal harvest, and retributive killing (Newmark, 2008; Ripple et al., 2015).

Critics of the conduct of the African hunting industry indicate that unregulated hunting may drive species’ population decline (Packer et al., 2011), or may disrupt animal age-sex structures (Loveridge et al., 2007). Hunting may also lead to “unnatural selection” (Festa-Bianchet & Mysterud, 2018). A key criticism is that the funds generated by hunting do not reach the intended beneficiaries in rural areas (Nelson et al., 2013).

The pendulation of the hunting debate is a distraction; it shifts attention away from more pressing threats to wildlife (Lindsey et al., 2016). The debate has, however, led to a more serious consideration of alternative funding streams (Lindsey et al., 2020). These include conservation aid, payments for environmental services (Dickman et al., 2011), and carbon offset schemes (sensu Bekessy & Wintle, 2008).

One issue that has emerged in the recent hunting debate is that African views have largely been excluded (Chaukura et al., 2019). The dominance of a Western narrative minifies the views of people in Africa, who may have positive attitudes toward trophy hunting (Angula et al., 2018; Stormer et al., 2019), or negative attitudes where concessions lead to conflict over access (Jew & Bonnington, 2011). Indeed, there is recognition that “western-normative ethical perspectives” dominate the hunting debate, with little consideration for diversity of worldviews (Di Minin et al., 2021). Africans may have different perspectives, and the opinions of all people may be further conditioned by demographic and cultural factors.

To examine the diversity of opinion, we developed three hypotheses around emerging themes in the debate, namely (1) support for trophy hunting differs between Africa and other regions, (2) heightened calls to ban trophy hunting (see Horowitz, 2019) do not reflect African views, and (3) opinions about alternate funding streams to hunting (see Lindsey et al., 2016) differ between Africa and other regions.

2 METHODS

2.1 Online survey

To explore social attitudes around trophy hunting in Africa, we designed an online survey that required respondents to state their support (1) for trophy hunting, (2) for blanket import bans on trophies obtained in Africa, and (3) for outside funding of conservation areas set aside for hunting. Information was requested on respondent geographic location, education, and demographic parameters. We limited our survey to 12 questions. We used the free survey platform Google Forms (e.g., Kiessling et al., 2019; Saayman et al., 2018).

We attempted to derive an equal sample of responses from people resident in Africa and outside of Africa. All authors used their networks to circulate the survey through email lists within (1) academia, (2) the private and public sector, (3) the nonprofit sector, and (4) the general public (targeted through social media, and flyers posted in urban spaces and University common areas). We requested all respondents to circulate the survey further, thereby helping to increase sample size.

We chose three response variables to assess the respondents’ attitudes toward trophy hunting in Africa, viz., point of view on trophy hunting (HuntingView), a blanket ban on trophy imports from Africa (BlanketBan), and the choice of outside funding (by affluent nations) of the wildlife areas now supported financially by trophy hunting (OutsideFunding). We analyzed respondents’ views toward regulated hunting with a 5-point Likert scale, asking for a response ranging from “do not support” (1) to “support” (5). Respondents’ views on full bans of trophy imports were analyzed through a binary yes/no response. Similarly, the prospect of outside funding was obtained as a yes/no response.

We used demographic and regional groupings, as well as conservation background as predictor variables. We provided three choices to provide information on “age” (by decade), “gender identity,” and “ethnicity” following the racial classification system of the United Kingdom Office for National Statistics (https://ons.gov.uk). Respondents could also select their (continental) geographic “location.” We asked respondents about their employment within, or association with conservation, environmental science,
or wildlife management (conservationbackground), and we asked respondents about their educational attainment (education) and academic discipline (edudiscipline). See Supporting Information for more detail on survey.

2.2 | Analysis of survey data

We received 5721 responses but removed 22 respondents who identified as nonbinary (due to the small sample size and because category-merging would be arbitrary) leaving \( n = 5699 \). The samples across demographic groups are provided in the Supporting Information, and Figure S4 provides the questionnaire.

HuntingView was analyzed using multinomial logistic regression (R package VGAM v1.1-5: Yee, 2010). We reduced the number of cells with zero frequencies by recoding the response variable (HuntingView) into three categories (i.e., support/neutral/do not support) instead of five (the reference category for comparisons was do not support). We similarly merged categories within the predictors to reduce zero frequencies: location was recoded as four categories (Africa (baseline)/Europe/North America/Rest of the World (RoW)), age was recoded as the two categories showing greatest differences (20–29 (baseline)/30+ years), and ethnicity was coded with three categories (Black (baseline)/White/Other+Mixed race). Conservationbackground (baseline: No) and gender (baseline: female) were binary and could not be simplified further.

Exploratory multinomial regressions were computed for main effects and all combinations of interactions, together with log-likelihood tests (to test for a significant reduction in residual deviance: here and elsewhere the significance level was 0.05), calculation of AICs, pseudo-\( R^2 \) values, and examination of multicollinearity using generalized variance inflation factors (GVIF) calculated with the R package CAR v3.0-10 (Fox & Weisberg, 2019). This allowed identification of a suitable model. Terms were excluded when they led to singularities in the Hessian matrix or were not significant (when used with other terms). The two “education” predictors were not included as they increased the number of cells with zero frequencies to > 21%, which is not desirable (Tabachnick & Fidell, 2019). This led to five main effects (location, conservationbackground, gender, age, ethnicity) and four interaction terms (location*conservationbackground, location*gender, location*age, gender*age) being included in the final model.

BlanketBan and OutsideFunding were analyzed with binary logistic regression (R package stats v4.03). The same exploratory approach described for HuntingView was used to identify suitable models. The BlanketBan model included the five main effects described for HuntingView plus the interaction terms gender*location, age*location, conservationbackground*location, age*gender, conservationbackground*gender, ethnicity*gender and conservationbackground*ethnicity. The same main effects were included in the OutsideFunding model, together with the interaction terms gender*location, conservationbackground*location, age*gender, ethnicity*gender. We used similar diagnostic approaches to those for the multinomial regression, as well as Hosmer and Lemeshow tests to investigate model goodness of fit.

3 | RESULTS

3.1 | Trophy hunting view

Over all respondents, 76% supported hunting. The AIC for the favored model containing five main effects and four interaction terms (see Methods) was 6126.7, lower than for the main effects only model (AIC = 6217.9). Pseudo-\( R^2 \) values were 0.342 for the Nagelkerke \( R^2 \) statistic and 0.216 for the McFadden pseudo-\( R^2 \). Squared GVIF (adjusted for degrees of freedom) were close to 1.00 for all predictors (range: 1.06–1.21).

Regional categories within locality were significant when compared with Africa for both neutral and support comparisons with the reference category (Figure 1 and Table S2). The exceptions were the support response for N. America, and neutral response for RoW which did not differ from Africa. Odds ratios were < 1 for all significant comparisons which indicated greater support for hunting in Africa. Nonetheless, there were significant interactions involving locality which take precedence over the main effects. Differences between gender categories depended on whether respondents were from RoW or Africa, with odds ratios of 1.2 (for neutral compared to the reference) and 2.5 (for support compared to the reference) respectively, that is, divergence between sexes for RoW was greater than between sexes for Africa. The same effect was detected for support in N. America where divergence between sexes was greater (odds ratio 1.9) than for Africa. The age*locality interaction was significant, with differences between age categories (for both neutral and support) being significantly greater in Europe than Africa. Interaction between age and locality was also significant for support for RoW versus Africa: the odds ratios were > 1 indicating that different age groups had more divergent views for RoW.

Conservation background was significant overall: a support response was 1.7 times greater among respondents with a conservation background (Table S2). The interaction between conservationbackground and locality
was significant for Europe (for both support and neutral against the reference category) and for N. America (for support against the reference only). Interestingly, differences between respondents indicating yes or no for conservation background were greater in Europe and lower in N. America, relative to differences between respondents with different conservation backgrounds from Africa.

The effect of gender was highly significant, but so were its interactions with locality (above), and age (for support). Differences between male and female support responses (relative to the reference) were nearly three times greater (odds ratio 2.7) for the older age group, relative to the younger age group, that is, attitudes were more divergent between male and female in the 30+ category.

There were no differences between ethnic groups in terms of neutral responses relative to do not support, although respondents from both White and Other+Mixed ethnic groups showed a higher propensity for support relative to do not support than Black respondents (even though response frequencies revealed generally high support for trophy hunting across all ethnic groups, on average—see Table S1).

### 3.2 Import ban on trophies

Over all respondents, 78% opposed an import ban. The AIC for the favored model with seven interactions was 4213.1, substantially lower than the same statistic (AIC = 4292.0) for the main effects only model. A good model fit was identified (Hosmer and Lemeshow test: $X^2_{[7]} = 6.647$, $p = 0.467$), and it was found to explain a very substantial proportion of the variance in the response ($\text{Nagelkerke } R^2 = 0.431$).

The main effect of locality was significant for both the RoW and Europe, versus Africa (import bans were 4.9 and 7.8 times, respectively, more likely to be supported than in Africa) but not for N. America (Figure 2 and Table S3). However, interaction terms involving location were also significant. There was gender*location interaction with differences between genders being greater in Europe than in Africa, although differences between genders differed significantly less for the corresponding comparison for N. America. Similarly, age*location interaction indicated less difference between age groups in Europe, compared with Africa. For conservation background*location, respondents with different conservation backgrounds were more
FIGURE 2 Significant coefficients with confidence intervals (95%) for the binomial logistic regression line on the response variable “support for a blanket ban on trophy hunting imports” (yes/no). A full table with all results is presented in Table S3.

3.3 | Outside funding

Over all respondents, 66% supported outside funding. The AIC for the favored model with four interactions was 6510.2, lower than for main effects alone (6536.0). The model fit was good (Hosmer and Lemeshow test: $X^2[7] = 5.935, p = 0.547$), while the Nagelkerke pseudo-$R^2$ statistic was 0.187.

Significant coefficients were obtained for all main effects (Figure 3 and Table S4): locality (i.e., lower support for Outside Funding for N. America compared with Africa), conservation background (greater support for Yes), gender (greater support for male), and ethnicity (greater support for White). However, several interaction terms were significant and take precedence.

Differences between conservationbackground categories were more divergent for N. America relative to Africa (1.4 times greater). The difference between male and female categories was smaller for Europe, N. America, and the RoW compared with the male–female difference for Africa. For the ethnicity*gender interaction, differences between White and Black were smaller for male relative to female.

4 | DISCUSSION

Location was strongly associated with respondents’ attitudes toward trophy hunting; respondents in Africa broadly supported the practice. Age, gender, ethnic group, and conservation background were further associated with respondents’ support for trophy hunting, although these factors were typically influenced by location (Figure 1). In Europe, for example, there was substantial divergence by age and gender, but in Africa, these groups had more similar views. Such differences may be cultural. Policy needs to account for diversity to account for imbalance, although we show that views within Africa are less diverse than in some other regions. We note that our online survey likely missed the views of rural African communities, although studies show similar views across age and gender (Angula et al., 2018). Conservation scientists may want to investigate why there is relatively strong African support for
trophy hunting, as a first step in ensuring culturally appropriate policy (see Goldman et al., 2013).

The importance of location is highly significant, particularly as there has been little consideration (to our knowledge) of the implicit bias caused by the most influential opinions originating from outside Africa. Scientists from the Global North have substantial influence; for example, we found that of all scientific papers published on hunting in Africa since 1970, a minority of the authors (~42%) were Africa based (Figures S1–3 and Table S5). African community leaders have notably objected to a lack of inclusion in the hunting debate (Chaukura et al., 2019). Policy on hunting should perhaps be weighted toward African views, given that African rural communities endure the costs of conservation (Jew & Bonnington, 2011).

On blanket bans of trophy imports from Africa (Figure 2), respondents from Europe and RoW again diverged from respondents in Africa (who, in general, were opposed to bans). Despite recent, high-profile calls for blanket bans (Horowitz, 2019), at a global level, only CITES can restrict trade in animal products from endangered species (www.cites.org). At a national level, import bans may be imposed, typically where there is evidence of population decline or mismanagement of hunted species (Casamitjana & Tsang, 2016).

Our survey pertained to bans imposed on taxidermied trophies, not a ban on hunting per se. Of interest, Botswana did prohibit trophy hunting in 2014 (now lifted). This impacted the livelihoods of rural communities in negative ways (Blackie, 2019). In 2018, the Botswana Government conducted nationwide consultations with affected rural communities, and there was unanimous opposition to the ban (LaRocco, 2020). Communities are more likely to self-organize to manage natural resources sustainably if those resources have value, and if they have decision-making rights over those resources (Murphree, 2009; Ostrom, 2009). Nonetheless, we note that land tenure insecurities, as seen in government-controlled hunting concessions in Botswana, may impede the involvement of local communities.

We detected African support for outside funding of conservation areas, should hunting be phased out (Figure 3), unlike the divergent North American view which opposed this. Foreign aid for conservation in Africa is already high, but further funding requirements appear inevitable (Lindsey et al., 2020). A caveat is that conservation aid in Africa may be counterproductive (see Bare et al., 2015).

Of note, respondents affiliated with conservation or wildlife management differed in opinion to non-conservationists on all points. Support for hunting among
conservationists may be because they are informed on the debate.

Trophy hunting may be a wicked problem, with no clear-cut solution, that necessitates overcoming inequalities and cultural differences for the best possible outcome (Chan et al., 2020; DeFries & Nagendra, 2017). Our work highlights cultural and geographic differences that need to be incorporated into policy, thereby bringing a multistakeholder perspective to a polarized discussion (see Biggs et al., 2017).

Our online study may not be entirely representative as it was not random, neither geographically nor socioeconomically. Nonetheless, our work has revealed important insights into sentiments toward trophy hunting in Africa. Views on trophy hunting within Africa require further investigation, and explicit incorporation into policy.

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AUTHORS’ CONTRIBUTIONS
SvH, RPB, and LWT wrote the paper. RPB, LWT, SvH, and TCW conducted analyses. All authors contributed to paper conception.

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DATA AVAILABILITY STATEMENT
Data available from corresponding author upon reasonable request.

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SUPPORTING INFORMATION
Additional supporting information may be found in the online version of the article at the publisher’s website.