



Control hunting of wild animals: health, money, or pleasure?

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Abstract In many parts of the world, millions of wildlife species are hunted for sport, food, skins, and other products. In recent years, a backlash has emerged from certain groups of society against this long-standing human pursuit. However, attitudes towards the control of wild animals to reduce the health risk to other animals, to lessen agricultural damage, or to protect game species, may generate a different reaction, where even killing is tolerated. In this paper, we analyze the public's acceptance of control hunting in Andalusia (southern Spain). Our results suggest that lethal control to improve domestic animal health is highly accepted (75%) is more controversial when animals are killed for damaging crops (59% acceptance) and is highly unaccepted when the goal is to enhance game species numbers (22% acceptance). Older people and males, in particular, accept more readily some of these control-hunting measures. These results are needed to understand better the public attitudes on which conservation managers can base their decisions when control hunting is required.

Keywords Animal welfare · Damage to agriculture · Game species · Lethal control · Public attitudes · Wildlife diseases

Introduction

Hunting, the practice of pursuing animals to capture or kill them for food, recreation, or trade of their products, has been practiced by humans for millennia. As hunter-gatherers, humans may have competed for prey with large predators (Graham et al. 2005), resulting in the deliberate targeting of these by humans (Shipman 2015). Subsequently, the transition to agriculture created greater motives for the control of wild animals, as well as their hunting for animal protein (Lee and DeVore, 2017). The lethal control of native wildlife has been and is still practiced in many countries. This is often aimed at the reduction of direct (e.g., predation) or indirect (e.g., disease) impacts of wild animals on domestic livestock, on agriculture, or to protect game species. Growing knowledge and concern that wild animals may be reservoirs of zoonotic diseases has also led to the intensification of lethal wild animal control (Gortázar et al. 2007).

In Spain, the control of problem animals has been undertaken even at national campaign levels, the latter being a

feature of government-sponsored vermin extinction programs in the 1950s (Villafuerte et al. 1998). More recently, Spanish legislation dictates that because hunters are responsible for the harm inflicted by game species, hunters must lessen this damage (Rios-Saldana et al., 2013). Nonetheless, as in many other parts of the world, to minimize the spread of diseases from wildlife to cattle and to protect agricultural exports, environmental agencies within the public administration are solely responsible for the control of non-game species (i.e., Enticott 2015).

Recreational hunting of legally-listed game species is still widespread in many parts of the world. Often, many problem animals are game species, so increased hunting of these can reduce their impacts (Rios-Saldana et al., 2013). However, since the mid 1970s, the animal rights lobby has intensified and especially against recreational hunting (Nurse 2013). Given this situation, there is the urgent need for more measured debates and better understanding of people's perceptions of legitimate and illegitimate killing of wildlife, as well as the role of cultural traditions in explaining the different views (i.e., Caro et al. 2017; Pardo and Prato 2005).

In this study, we analyze public attitudes to control hunting in Andalusia (southern Spain). Andalusia is the Spanish region with the highest number of legally licensed hunters (253,000); around 4% of the adult population (www.mapama.gob.es). This was part of a larger project investigating people's attitudes towards wildlife, hunting, and conservation management in the region.

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Material and methods

We interviewed a total of 750 adults (> 18 yrs.) selected from persons among the 3400 participants in the Social Research Panel of Andalusia (PACIS, www.pacis.es). PACIS is comprised of randomly selected households as representative of the Andalusian population. Members of these households are contacted periodically to respond to a questionnaire on different topics of interest to Andalusia and Andalusians.

For our study, we selected PACIS subjects in a stratified manner by age and sex groups. The survey was answered online or by telephone for those individuals without Internet access. Interviews were administered between May and June 2017. The maximum sampling error was $\pm 3.6\%$ ($p = q = 0.5$).

The full questionnaire consisted of a total of 40 questions, including questions on the respondents' sociodemographic characteristics. More specifically, we asked respondents to note their degree of agreement with regards to controlling wild animals if they: (1) presented damage to agriculture, (2) may transmit diseases to other animal species, and (3) affected other species of recreational hunting interest. Respondents were asked to select their level of agreement by using a seven-point rating scale, ranging from completely disagree (= 1) to completely agree (= 7). At the start of the questionnaire, all respondents were provided with information on the aims of the study and definitions such as what constituted a wild animal.

We undertook data analysis by classifying respondents according to four age groups (18–29; 30–44; 45–59; > 60 years), and their current area of residence were divided into rural (countryside and towns < 10,000 inhabitants) or urban (towns > 10,000 inhabitants) according to MARM (2009). To adjust for sex, age, and area of residence, data were weighted by the raking method (Valliant et al. 2013).

We employed IBM SPSS® (v 24.0) PLUM procedure (polytomous universal model; Norušis 2005) to test for the influence of sociodemographic variables (age, sex, and area of residence) on the level of agreement with statements about control hunting of native species. This is an extension of the generalized linear model for ordinal responses which, by applying backward regression analysis, allowed us to determine the simplest significant models (if any) and the categories of the final variables that were affecting to each one of the considered statements.

Results and discussion

Most interviewees agreed with the use of hunting to control wild animals if they presented health problems for other animals (75.1%), or if they damaged agriculture (59.2%; Fig. 1). However, a significantly lower proportion (22.1%) agreed

with the use of hunting to control animals that may negatively affect game species (Fig. 1). Tuberculosis is the main disease for which control hunting to prevent cattle infection is carried out; the most important hunting species affected being the wild boar (*Sus scrofa*; Enticott 2015). In contrast, the red fox (*Vulpes vulpes*) is the game species more frequently hunted because of its impact on other game species (Delibes-Mateos et al. 2013). Interestingly, more than half of the respondents (53.8%) selected “completely agree” or “mostly agree” when referring to lethal control for health purposes, while this proportion was only 29.6% for hunting to avoid agricultural damage (Fig. 1). Conversely, out of the seven possible answers, “completely disagree” was the most chosen by people when asked for their opinion on control hunting to benefit game species (33.3%; Fig. 1).

The responses offered by a representative sample of people consulted on their acceptance of different control hunting methods contrast with the actual frequency of use of each of these. Thus, in spite of the growing importance of controlling wild animals to prevent diseases from wildlife (Gortázar et al. 2007), its use is still insignificant. However, hunting control to minimize damages to agriculture or to enhance game species populations are more common. As an example, to minimize damage to cereal crops, vineyards, or olive trees, hunting control of the European rabbit (*Oryctolagus cuniculus*) in 2005 was requested by 1938 (51%) game estates in Castilla-La Mancha (central Spain; Rios-Saldaña et al. 2013). Similarly, predator control is widespread in southern and central Spain (Delibes-Mateos et al. 2013) where approximately 90% of hunting estates employ this method to improve rabbit and red-legged partridge (*Alectoris rufa*) numbers. Although we have not tested this hypothesis, perhaps these results indicate that people are more likely to accept such hunting controls because they usually are not required.

According to Dawkins (2006) “good animal welfare” involves physical health and positive emotions, such as pleasure and contentment. In this context, animal health may be a good indicator of animal well being. Our results, at least for the Andalusian population, suggest that wild animal welfare concerns surpass acceptance of control hunting for economic reasons, and there is even less acceptance of recreational hunting. Welfare concerns will probably grow in the future since, according to the last Special Eurobarometer (2016), 94% of Spanish citizens consider important to protect the welfare of farm animals, and 84% believe that they should be protected better than they are now.

In this study, we show that there are several demographic variables that were significantly associated with responses to some statements on control hunting (Table 1). For example, men and older people, particularly those in the 45–59 age group, were more likely to agree with control hunting to prevent health problems of animals. Only the 45–59 age class was significantly less critical when asked about the control

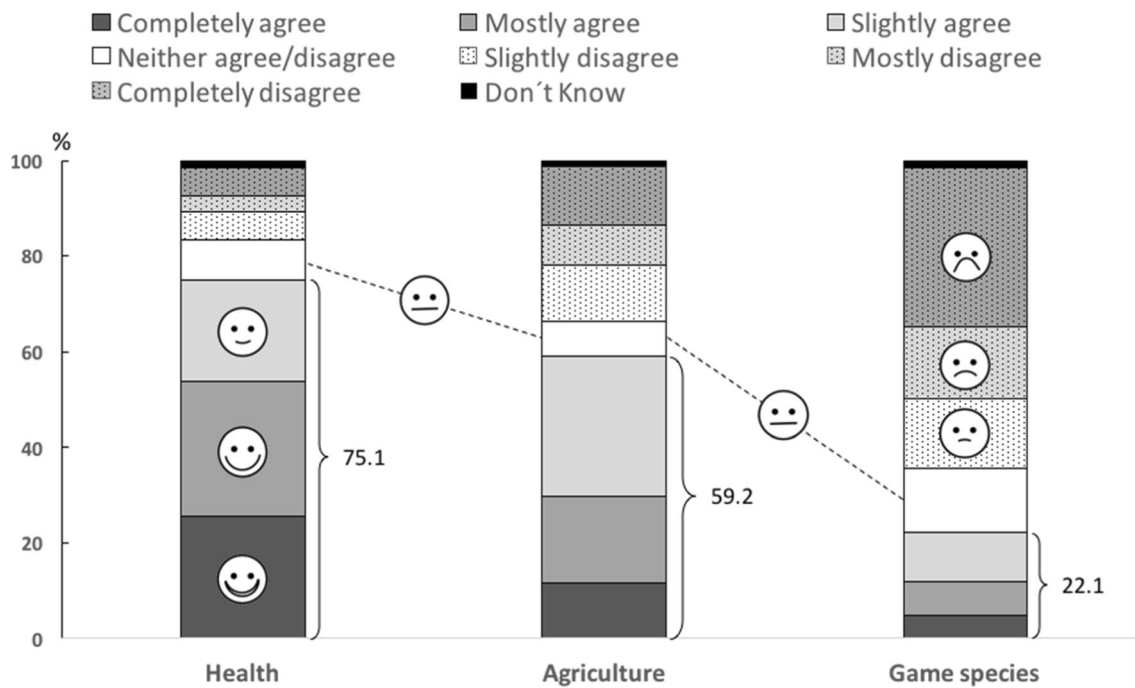


Fig. 1 Proportion of agreement with each one of the three statements considered (see text for further details)

of wild species that may affect game species. Bremner and Park (2007), in a study on the control of non-native species in Scotland, found that men and older people (45–54), but as in our case, not the oldest age cohort, were more likely to support the control and eradication for economic reasons. As suggested by these authors, perhaps these attitudes may be less related to age and more to a particular generation.

Males have been shown to have a more positive attitude towards hunting than females, while females more often will stand against cruel and exploitative treatment of animals (Kellert and Berry 1987). However, in our case, gender did not significantly influence attitudes towards control hunting to

enhance game species populations. Recent studies have also shown that contrary to expectation, gender has little explanatory power (Gamborg and Jensen 2017).

Farmed areas cover ~ 60% of Andalusia, where agriculture has been historically the most important activity for a large proportion of the population even for people in large towns (Moyano and Garrido 2002). Given the preponderance of an agricultural background, acceptance of lethal control of wildlife to avoid damage to agriculture was unaffected by age, gender, or area of residence (Table 1). Moreover, area of residence had little influence on the rest of statements. In other studies, the difference in attitudes toward animals between urban and rural residents has been shown to be significantly variable (Bremner and Park 2007; Dandy et al. 2012; Gamborg and Jensen 2017), indicating that this aspect requires deeper analysis.

In general, our results show that the acceptance to kill an animal is highest when the reason is to improve other animals' health. However, even in an agricultural-based economy, control killing of animals, which damage agriculture, was unacceptable to a large number of people interviewed, representative of the Andalusian society. Finally, controlling animals to benefit game species was greatly unacceptable, perhaps showing a high and negative perception towards recreational hunting, an activity that is showing a steady decline in Spain (Herruzo and Martínez-Jauregui 2013). These outcomes suggest that sociological studies are useful to provide conservation managers a better understanding of public attitudes on which they can base management decisions, education programs, and publicity when hunting control may be required.

Table 1 Coefficients and P values associated with significant sociodemographic variables derived from backwards ordinal regression tests of attitudes to particular statements on hunting control

Significant at the 5% level	Coefficient	SE	Wald	d.f.	Sig. (P)	
Control hunting when wild animals transmit diseases to other animals ($\chi^2 = 12.008$, d.f. = 4; $P = 0.017$)						
Age (years)	30–44	0.343	0.198	3.003	1	0.083
	45–59	0.548	0.202	7.353	1	0.007
	> 60	0.394	0.202	3.799	1	0.051
Gender	Female	–0.280	0.131	4.531	1	0.033
Control hunting when wild animals damage agriculture (n.s.)						
Control hunting when wild animals affect game species ($\chi^2 = 9.766$, d.f. = 3; $P = 0.021$)						
Age (years)	45–59	0.543	0.180	9.113	1	0.003

Reference categories: male, < 30 yrs

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