

Comparing conservation and animal welfare professionals' perspectives on domestic cat management

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ARTICLE INFO

Keywords:

Q-methodology
Companion animals
Conservation conflict
Social research
Human dimensions
Domestic species

ABSTRACT

Debates about managing roaming and hunting behaviours in domestic cats often appear to fracture along lines of biodiversity conservation and animal welfare. In practice, however, there may be no inherent opposition between these interests. We carried out a series of Q methodological studies with people in the UK who were professionally engaged either with wildlife conservation or with animal welfare, and who had key individual stakeholder roles as cat owners. Participants arranged a set of statements according to their perspectives on roaming and hunting behaviours and on cat husbandry practices. Analysing the two professional groups together, we found three distinct perspectives: 'Conservationist', concerned about cat impacts on wildlife populations; 'Welfarist', focused on ensuring cat safety and wellbeing, and 'Liberationist', prioritising cat behavioural freedom. Analysing responses within the professional groups, however, we found that cat owners from both conservation and welfare organisations held perspectives that had much in common, and either (a) supported active management of roaming and hunting behaviour, (b) tolerated hunting behaviour as either desirable or unavoidable, or (c) were conflicted, supporting outdoor access for cats but expressing concern about hunting behaviour and cat safety. While their priorities may differ, cat owners working as conservation professionals were cognisant of cat welfare considerations, and animal welfare professionals were often also concerned about wildlife, particularly wild animal welfare. We also identified important areas of agreement on night-time confinement and regulation of cat breeding. This research highlights valuable opportunities for constructive dialogue and greater collaborative working among conservation and animal welfare organisations.

1. Introduction

Domestic cats are predators that hunt and kill wild animals. They are also one of the world's most popular companion animals. Until the mid-twentieth century, most cats were free-roaming and only loosely associated with particular households (Crowley et al., 2020a). Today, cats in post-industrial societies are more likely to be 'owned' by people, but many retain some access to the outdoors. This varies by region; cats in the UK and New Zealand, for example, are more likely to be 'indoor-outdoor' (see Crowley et al., 2019) than those in the USA, Australia, and Japan, which are more often kept entirely indoors (Hall et al., 2016; Foreman-Worsley et al., 2021). The management of free-roaming domestic cats is a contentious topic in scientific and public discourses (Marra and Santella, 2016; Leong et al., 2020; Wald and Peterson, 2020). There is plenty of evidence of the depredation of wild animals by

globally distributed and abundant cats (Loss and Marra, 2017; Mori et al., 2019; Murphy et al., 2019), and of their contribution to the declines and, in some cases, extirpation of vulnerable species, particularly on islands (Medina et al., 2014). This has led to calls for greater regulation and management of both owned and unowned domestic cat populations (Calver et al., 2011; Loss and Marra, 2017; Trouwborst et al., 2020). However, these concerns have been met with opposition from people arguing that evidence of detrimental, population-level ecological impacts is insufficient to justify extensive control, or who might give greater or more immediate consideration to the lives and welfare of cats over those of wild animals (see Peterson et al., 2012; Leong et al., 2020; Crowley et al., 2020b).

While the specificities of the arguments surrounding owned and unowned cats vary, disputes surrounding cat management often appear to track longstanding divergences between ethical orientations that aim

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<https://doi.org/10.1016/j.biocon.2022.109659>

Received 10 May 2022; Received in revised form 22 June 2022; Accepted 29 June 2022

Available online 8 July 2022

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to protect individual animals (potentially at the expense of collectives) and those that prioritise animal collectives (potentially at the expense of individuals) (Leong et al., 2020). Particularly in conservation discourses, there is a dominance of what Lynn et al. (2020) call 'orthodox' conservation arguments that fundamentally prioritise the interests of (native, wild) populations and species over those of individual animals and populations of introduced or domestic species. Other contributors to the debate (referred to here as 'cat advocates') are not only more likely to focus on cat welfare, but also draw on an ethical foundation of domestic cats' close relationships with humans, and therefore people's indirect responsibility for protecting and nurturing all cats, whether they are owned or not (see Crowley et al., 2020a).

Cat advocates are also divided on the issue of allowing cats to roam outdoors. Rather than ecological impacts, the 'indoor/outdoor' debate among cat advocates largely revolves around different understandings of what constitutes good cat welfare (Foreman-Worsley et al., 2021). Cats kept largely or solely indoors (or in contained outdoor spaces such as 'catios' or fenced garden enclosures) are at reduced risk from road traffic accidents, diseases, injury from cats or wildlife, and theft, and reducing such risks is a key driver of cat containment (McLeod et al., 2015; van Eeden et al., 2021). Nevertheless, roaming (and indeed hunting) behaviour provides stimulation and exercise to cats, and owners regularly express concerns – shared by some cat welfare and veterinary organisations – that permanent confinement, particularly of cats that are used to outdoor access, can produce poor welfare outcomes including higher levels of stress, obesity, and associated pathologies (Foreman-Worsley and Farnworth, 2019; Lawson et al., 2020). Accordingly, cat owners are generally less likely than non-owners to support confinement if suggested solely as a means of managing hunting (Hall et al., 2016; Elliott et al., 2019; Gates et al., 2019), though they may adopt this action as a means of reducing risks to cat welfare (Foreman-Worsley et al., 2021).

Public controversies around cat management have been inspired and amplified by both wildlife conservation and animal protection organisations, with their stated positions often forming the framework around which this issue is discussed (Peterson et al., 2012; Loss and Marra, 2018; Leong et al., 2020). Although individual stakeholders may have more nuanced views than those expressed by the organisations representing them (Wald et al., 2013), the moral certainty and strength of feeling expressed in these disputes indicates that in some regions the debate has established itself as a chronic conservation conflict (Redpath et al., 2013). A symptom and product of deteriorating relations between parties in conflict is the reduction of context, complexity, and nuanced discussion to simplistic, combative arguments, designed as much to defeat the opposition as to identify or move towards improved end points (Crowley et al., 2017; Keenan et al., 2020). The presence of entrenched conflict therefore makes disentangling the intricacies of key areas of disagreement difficult. In the United Kingdom, while disagreements surrounding cat management do exist, there is less overt, and less entrenched contention about this issue in public discourse than elsewhere (e.g. the USA: see Marra and Santella, 2016; Wald and Peterson, 2020). Neither animal welfare nor conservation organisations (the majority of which are membership-based charities) have vocally advocated for specific forms of cat management in the UK (Palmer, 2022).

It is in this context that we aimed to examine more closely the existence, extent, and dynamics of differing views between 'conservation' and 'welfare' approaches to the management of owned cats. In a previous study, we identified five distinct perspectives among lay cat owners in the UK on the issues of cat roaming and hunting behaviour (Crowley et al., 2020a, 2020b). Here, we employ the same Q-methodological approach to determine whether polarised or more nuanced perspectives exist among people working professionally in the fields of wildlife conservation and animal welfare. These individuals are likely to have more investment, expertise and influence in debates and policies relating to domestic cat management than lay participants. Previous

research has found significant differences in perspectives on management among cat-owning and non-cat-owning participants (Hall et al., 2016; Mamenno et al., 2017; Walker et al., 2017; Gates et al., 2019; Rand et al., 2019; Bassett et al., 2020). For this study, we only recruited cat-owning participants because (a) in the UK, decisions about cat management are primarily made by individual cat owners, making them a key group in effecting management; (b) we were interested in how cat-owning professionals' personal views on cat management may align with, or differ from, stereotypical positions and (c) engaging people both as professionals and as cat-owning individuals might reveal novel areas of interest, tension or agreement. We aimed to identify perspectives of cat-owning wildlife conservation and animal welfare professionals in relation to concern about cat impacts on wildlife, support for management measures, and feelings of responsibility for managing cat behaviours. We were also interested in the extent to which there was diversity or internal consistency *within* these groups of professionals, and whether these might indicate areas of common ground between the two groups that could form the basis for constructive dialogues among professional actors or engage groups of people that do not fit neatly into the purported warring factions of those who 'love wildlife' and those who 'love cats'.

2. Methods

2.1. Design

Q methodology has its origins in psychology and is a useful technique for identifying and exploring people's subjective views on a given topic (Watts and Stenner, 2012). Its value as a tool for understanding different perspectives on complex issues in conservation science is increasingly recognised (Zabala et al., 2018). Participants arrange a sample of items, usually a series of written statements, in accordance with their views (e.g. degree of agreement or disagreement). Their completed arrangements ('Q sorts') are then analysed using a combination of quantitative factor analysis and qualitative interpretation to identify distinctive perspectives shared among multiple participants. Q methodology is particularly useful for identifying within- and between-group differences on a given issue; as a ranking exercise, it requires participants to identify not only which statements they agree with, but also those about which they feel most strongly. The analysis is therefore able to identify different perspectives even among people who express broad agreement on an issue.

We used a set of 62 statements (see Table 1), designed for a previous study of cat owners (Crowley et al., 2020b). The statements covered a wide range of views on cat hunting and roaming behaviours and their management. All statements are distillations of real opinions expressed by UK cat owners in interviews with the research team (see Crowley et al., 2019, 2020b). Statements were printed on cards and participants followed a sorting procedure that started with dividing statements up into three piles (those they agreed with, disagreed with, and were unsure or didn't feel strongly about) and then arranging them with reference to a fixed array from +5/6 "most strongly agree" to -5/6 "most strongly disagree" (Fig. 1). The shape of the array approximates a normal distribution and requires participants to partially rank their statements, with fewer statements permitted at the extreme ends. Participants are therefore required to consider all statements carefully and decide which views are most important to them. Following the sorting exercise, we conducted short follow-up interviews to allow participants to discuss the reasoning for their decisions: quotes from these interviews are provided in the results to aid interpretation of the perspectives. Cards were then flipped to show their statement reference number on the reverse (as depicted in Fig. 1), and the final sort was photographed to ensure accurate data entry.

2.2. Participants

Participants were selected by purposive sampling based on

Table 1

Factor arrays showing statements and comparison of perspectives on cat hunting and roaming behaviours and their management, from three analyses of cat-owning professionals: (A) across all participants (B) among wildlife conservation professionals and (C) among animal welfare professionals. Factors are derived using principal component analyses and are summarised as factor arrays, in which the scores for each statement represent a weighted average derived from the contributing sorts for each factor. For ease of comparison, statements with which a perspective tended to agree are coloured green; statements with which a perspective tended to disagree are coloured orange. ^c = Consensus statements within each analysis (e.g. the 'within-welfare' analysis could not statistically distinguish between all factors responses to Statement 2). Factors within Analyses are presented in decreasing order of the eigenvalue and proportion of explained variance from the principal components analyses.

	Statement	Analysis A (all participants)			Analysis B (wildlife conservation professionals)			Analysis C (animal welfare professionals)		
		Conservationist	Welfarist	Liberationist	Active	Tolerant	Conflicted	Conflicted	Active	Tolerant
1	I am concerned that being kept inside doesn't give cats the stimulation they need	1	2	3	1	3	0	4	2	2
2	I've never seriously thought about whether cats affect wildlife populations	-5	-2	-5	-5	-6	-3	-2	-3	-2
3	If my cat was killed when roaming, I would feel guilty that I hadn't prevented it	-1	3	-4	-1	-4	3	1	-1	-1
4	Cats that are brought up indoors are used to it	1	1	-4	0	0	-1	2	1	-6
5	Cats hunting doesn't bother me	-6	-1	2	-6	-1	0	-4	2	2
6	I worry about the effect of cats hunting on garden bird populations	6	-2	1	6	3	0	0	-1	0
7	Cats help to keep rodent populations down	-1	1	1	-1	-4	4	-1	3	2
8	Choosing to keep cats indoors is fine as long as the owner provides a lot of stimulation	2	3	-3	2	-1	4	1	4	-4
9	When I got a cat, I didn't really think about whether it would hunt	-4	-1	-2	-4	-5	-2	0	-1	0
10	I can understand some people being anti-cat because of their hunting behaviour	4	2	3	3	4	3	3	1	2
11	Keeping cats indoors keeps them safe	0	1	-1	0	1	3	1	0	-5
12	One cat can't do much harm to wildlife by itself	-3	0	0	-3	-2	2	-1	0	0
13	Cats that bring in prey do so as a present for their owners	0	-2	1	-1	4	1	-1	-4	-1
14	Where there is vulnerable wildlife, people should not be allowed to have cats	3	-4	0	2	3	-6	-4	-2	-3
15	It is natural for cats to want to go out into the world; if they happen to fall foul of it, that's also natural	0	0	4	0	3	2	1	0	4
16	Any declines in wildlife cannot be blamed primarily on cats	1	4	4	1	5	4	4	3	4
17	Cats should be kept inside to stop them hunting	0	-5	-6	0	-5	-4	-5	-5	-6
18	There are too many cats in this country	2	-2	0	2	1	-2	-2	-1	0
19	If you spend enough time with your cat, it can make a difference to the amount it hunts	-1	0	-4	0	-1	1	-2	6	-3
20	If you keep cats in at night they won't catch as much	3	2	0	3	-1	2	0	2	-1
21	I would only really be concerned about cats hunting if they were catching birds	-4	-4	-6	-4	-6	-2	-4	-3	-5
22	When there are baby birds around, cats should be kept indoors or in restricted areas of gardens	3	-1	-3	5	-1	-1	1	-3	-4
23	I don't want to have to spend time playing with the cat	-5	-6	-4	-5	-3	-6	-6	-6	-4
24	Cats should be able to have the sun shining on their faces, to explore grass, to hunt insects and mice	0	3	3	0	2	5	2	1	5
25	If there was scientific evidence saying, 'this species is endangered because of cats', then I would take managing my cat's hunting behaviour much more seriously	5	2	2	4	5	1	3	1	1
26	Wildlife has more of a right to life than a cat has the right to be outdoors	2	-5	-2	3	0	-5	-4	-2	-5
27	Cats should be allowed out but it's OK to keep them in at night	4	6	2	4	0	6	5	5	3
28	I would be proud of my cat for hunting	-6	-5	-1	-6	-5	-5	-5	-4	1
29	Cats that go outside will hunt wild animals if they get the chance	3	0	4	3	6	-1	0	0	2
30	Collars can be dangerous for cats	-1	5	1	-1	-1	-1	4	5	1
31	I want cats to be hunting and keeping the vermin down	-5	-3	0	-4	-4	-1	-5	-1	1
32	I worry that roaming cats are at risk of being deliberately hurt by people	0	0	-5	0	-2	0	1	-1	-2
33	I worry about roaming cats being lost, stolen or killed by traffic	0	5	-3	1	0	5	5	0	-2
34	I love wildlife, but hunting is just what cats do	-3	4	5	-3	4	2	3	3	5
35	Having to deal with prey that cats bring home is disgusting	-1	-3	-3	-1	-2	-4	-1	-2	-3
36	I worry about diseases that roaming cats could pick up	-2	-1	-2	-2	-3	0	0	-2	-1
37	I worry that foxes will attack cats that are out at night	-2	-2	0	-1	-3	-3	-2	-3	1
38	I want a cat that comes inside, so I wouldn't want an outdoor-only cat	2	5	1	2	1	2	6	2	0
39	I would be unhappy if my cat caused any animal to suffer	4	3	0	5	0	5	5	1	0
40	I would be more inclined to try and manage my cat's hunting if it was killing stuff all the time	2	1	1	2	2	3	2	1	0
41	Hunting by cats annoys me because I know they're not hungry	1	-4	-5	1	-2	-2	-3	-5	-4
42	If my cat brought prey home and I could rescue it, I would	5	6	4	4	6	6	6	4	4
43	Their hunting is the least attractive aspect of cat ownership	5	-1	-1	5	-3	1	1	-1	-1
44	Some cats would prefer to be indoors	1	2	-1	1	0	-1	2	4	1
45	Quick-release collars are no use because cats regularly lose them	-2	-2	1	-2	1	-2	-2	-2	1
46	Cats do not belong in the house	-3	-6	-2	-3	-2	-3	-6	-6	-3
47	The benefits to cats of going outside outweigh the risks of them getting injured or lost	1	3	5	1	5	3	3	3	5
48	Collars with bells are bad for a cat's mental wellbeing	-3	0	-1	-3	-2	-3	-1	2	0
49	Hunting is a good sign because it shows that cats are comfortable and behaving normally	-2	0	2	-2	1	0	0	0	3
50	Cats should have the right to roam where they please, like a wild animal	-4	1	6	-5	2	0	0	3	6
51	Letting cats roam free causes havoc for our threatened wildlife	1	-4	-3	1	0	-4	-3	-4	-2
52	It's straightforward to make a garden secure and cat proof	-2	-1	-2	-1	-4	-4	-3	0	-1
53	If you choose to have a cat, and it hunts, you have to put up with it	-3	2	5	-3	2	1	2	1	4
54	Cats hunting is just a nuisance	-1	-3	-2	-2	-3	-3	-3	-2	-3
55	Owners can't stop their cats hunting	-4	0	3	-4	1	2	-1	0	3
56	Bell collars can effectively reduce the amount of animals cats catch	3	-1	2	2	4	1	2	-5	2
57	Keeping cats indoors is cruel	-2	-3	2	-2	0	-2	-3	-3	3
58	Cats should have free access to both the house and the outdoors	-1	4	6	-2	3	0	3	4	6
59	Breeding of cats should be regulated	2	4	3	3	2	1	4	6	3
60	It is my responsibility, as an owner, to manage my cat's hunting behaviour	6	1	-1	6	2	4	0	2	-2
61	I know what owners can do to effectively control their cat's hunting	4	1	0	4	1	-1	-2	5	-1
62	Cats are cruel to their prey	0	-3	-1	0	-1	-5	-1	-4	-2
Eigenvalue		11.60	11.49	6.88	8.42	4.92	2.91	6.82	5.35	4.24
% explained variance		18.41	18.24	10.92	27.15	15.86	9.38	21.31	16.71	13.24
Cumulative % explained variance		18.41	36.65	47.57	27.15	43.01	52.39	21.31	38.02	51.26

professional occupation. Two groups of participants were recruited: cat owners working professionally in wildlife conservation, and cat owners working professionally in animal welfare and rescue. We contacted a selection of national and regional conservation and welfare organisations to circulate details of the study and seek cat-owning volunteers.

Participants typically completed the Q-sort exercise at their work premises. All participants provided informed written consent to take part in this research: names and organisational affiliations have been removed. The study received ethical approval from the University of Exeter (eCORN000442v3.3).

Most Disagree				Neutral				Most Agree			
					54						
				11	47	49					
			2	51	48	40	30				
		35	37	7	45	38	57	42			
	50	13	4	52	9	3	16	61	59		
21	53	20	36	41	32	8	1	43	26	56	
5	34	27	55	12	23	33	10	24	25	14	22
28	31	58	46	15	19	17	62	60	6	18	39
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
											44
											29

Fig. 1. Constrained distribution used in the Q-sorting exercise. Participants place each of 62 statements into a column according to the strength of their agreement or disagreement, where -6 is Most Disagree and $+6$ is Most Agree. The numbers of statements that can be placed in each column is fixed, as shown. The example shown is for a Wildlife Conservation Professional participant. Each number in each cell corresponds to a statement in the Q-set (statements provided in full in Table 1).

2.3. Analysis

Each participant only completed one sorting exercise, but we conducted three separate analyses of their responses, to identify perspectives among:

- All participants
- Conservation professionals
- Welfare professionals

We followed the same analytic procedure for all three analyses, using principal component analysis with varimax rotation in the 'qmethod' (Zabala, 2014) package for R (v.4.0.2). We applied both statistical and theoretical criteria to identify the most appropriate number of factors to extract and in all three analyses, we accepted 3-factor solutions (code and data available at DOI:10.5281/zenodo.6798246). All analyses explained $>40\%$ of the overall variance and are therefore considered sound, if not fully explanatory, solutions (Watts and Stenner, 2012). Q-sorts of participants whose perspective was significantly associated with a factor were automatically flagged and used to calculate weighted means (z-scores) that indicate the relative position of each statement in relation to the factor. These weighted means are then used to construct 'ideal' distributions of statements for each factor ('factor arrays': see Table 1). We used the systematic method of factor interpretation outlined by Watts and Stenner (2012) to develop descriptions of each factor. Follow-up interviews were transcribed and thematically coded to assist with factor interpretation. The following descriptions should be read with reference to Table 1. The numbers in brackets indicate the statement number (in bold) and its score (based on the weighted mean) in the relevant 'ideal' factor array, where $(3 + 6)$ indicates strong agreement with statement number three.

3. Results

31 cat-owning professionals from four conservation-oriented organisations and 32 cat-owning professionals from six animal welfare-oriented organisations participated in the study. The wildlife conservation-oriented organisations included one regional charity, two national charities, and one international organisation. Two organisations focused on birds and two on wildlife more broadly: participants from these organisations are referred to as 'Wildlife Conservation Professionals' (WCPs). The welfare-oriented organisations comprised two national charities, three regional charities, and one international charity. Two organisations focused primarily on cat welfare, and three on domestic animal welfare more broadly. Participants from these organisations are referred to as 'Animal Welfare Professionals' (AWPs).

4. Analysis A: all participants

Our analysis of all 63 Q-sorts together identified three factors (hereafter 'perspectives') that collectively explained 47.6 % of the overall variance. 56 participants were associated with one of the three

perspectives, though 7 were not significantly associated with any and were excluded from Analysis A (Fig. 2). All 7 (three animal welfare professionals and 4 wildlife conservation professionals) were associated with either 'tolerant' or 'conflicted' perspectives in later Analyses B or C (see below).

4.1. Conservationist

"You should be mindful of the potential impact that [your cats] could have on wildlife and take steps to minimise that impact."

(WCP3)

All 19 participants significantly associated with this perspective were Wildlife Conservation Professionals. Those aligned with the *Conservationist* perspective have thought seriously about whether cats affect wildlife (2–5), dislike hunting behaviour (5–6; 28–6; 43 + 5) and are particularly worried about cats' effects on garden bird populations (6 + 6). They don't feel strongly about cat containment practices (1 + 1; 4 + 1; 8 + 2; 11 0; 17 0; 24 0) but disagree that cats should have the right to roam like wild animals (50–4). They believe that owners have a responsibility to manage their cat's hunting behaviour (60 + 6; 53–3) and feel that they know how to do this effectively (55–4; 56 + 3, 61 + 4): "the information is out there if you...just use Google effectively" (WCP7). They support some restrictions on cat ownership or outdoor access (27 + 4; 59 + 2) where there are vulnerable wildlife populations (14 + 3; 22 + 3). They would be further inclined to manage their cat's hunting behaviour if there were specific evidence that a species' decline was due to cats (25 + 5).

4.2. Welfarist

"I don't like the thought of [my cat] hurting anything but I also understand it's nature, it's natural."

(AWP2)

The majority ($n = 25$) of the 28 participants significantly associated with this perspective were Animal Welfare Professionals and the remaining three were Wildlife Conservation Professionals. Those aligned with the *Welfarist* perspective expressed uncertainty or ambivalence about cats' impacts on wildlife (5–1; 6–2; 12 0; 25 + 2; 29 0) and the management of hunting behaviour (61 + 2; 60 + 1; 56–1; 40 + 1; 25 + 2; 53 + 2). They wouldn't be proud of their cat for hunting (28–5) and dislike the idea of their pets causing suffering (39 + 3; 42 + 6) but believe that hunting is 'just what cats do' (34 + 4). They prioritise cat safety and welfare, expressing concern about roaming cats being injured or killed (2 + 3; 33 + 5) and about collars (30 + 5), but believe that cats should have free access to both the house and the outdoors (58 + 4; 47 + 3; 38 + 5; 27 + 6; 24 + 3): "we're always trying to find a happy compromise... that takes into account everybody's welfare and it's not always an easy rule" (AWP22). This belief holds even where cats' roaming poses a risk to wildlife (26–5; 22–1). Management of hunting alone is not considered sufficient reason to contain cats (17–5), but the Welfarist perspective is not generally opposed to keeping cats indoors (4 + 1; 11

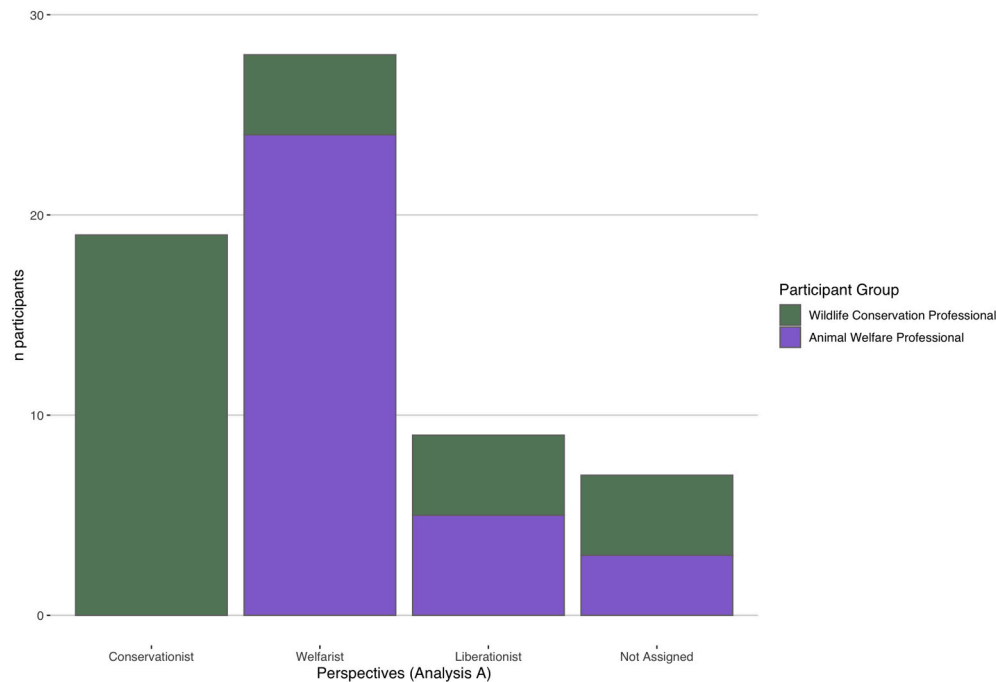


Fig. 2. Distribution of 63 cat-owning professionals working for wildlife conservation and animal welfare organisations, among three perspectives on cat roaming and hunting behaviour and its management. In this Analysis A, all participants are combined in a single analysis. 7 of the 63 participants did not adhere to any of the three perspectives (Not Assigned).

+ 1; 57–3), particularly if owners provide enrichment (8 + 3; 1 + 2). **4.3. Liberationist**

“We just have to accept cats for cats being what they are, which is carnivores and hunters.”

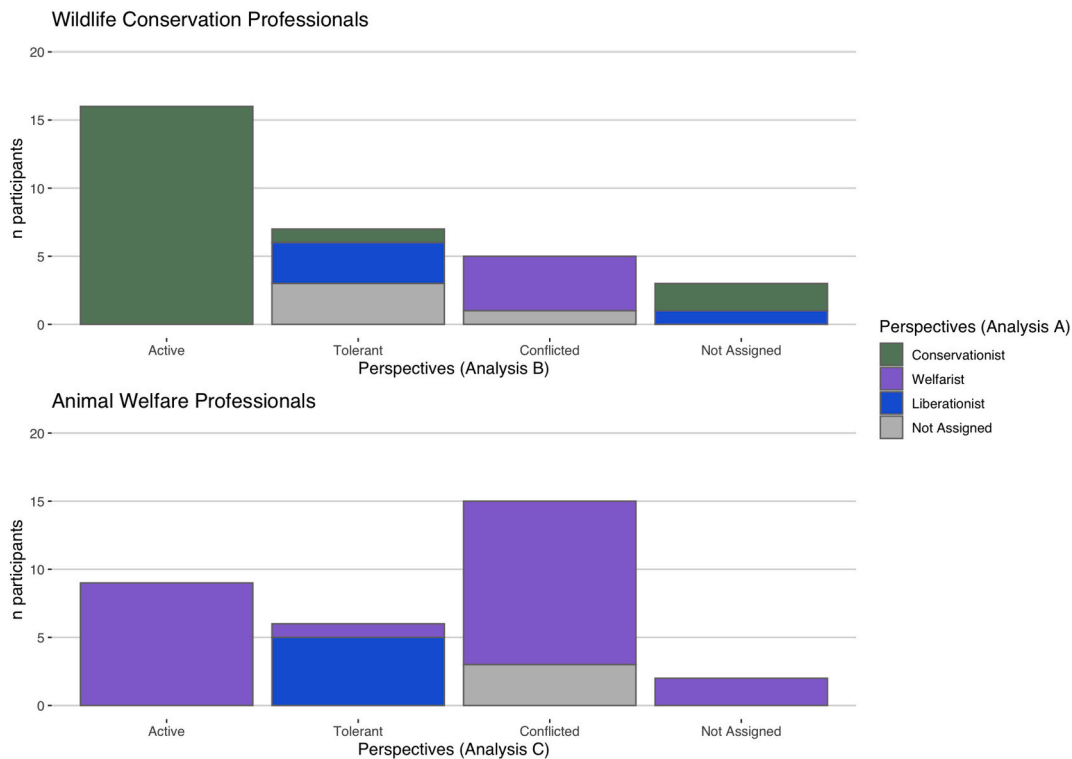


Fig. 3. Distribution of cat-owning professionals working for wildlife conservation and animal welfare organisations, among perspectives on cat roaming and hunting behaviour and its management. In these analyses, professional groups are analysed separately as Wildlife Conservation Professionals (Analysis B, n = 31) and Animal Welfare Professionals (Analysis C, n = 32). Colours show the relationships of participants to the perspectives identified across all participants in Analysis A (Conservationist, Welfarist, Liberationist and Not Assigned).

(AWP32)

Wildlife Conservation Professionals (n = 4) and Animal Welfare Professionals (n = 5) were both associated with this perspective. The *Liberationist* perspective is characterised by strong views on cats' access to the outdoors. They believe that cats should be able to roam freely (50 + 6; 24 + 3; 58 + 6) and that the benefits of roaming outweigh any risks posed to either the cats themselves (47 + 5; 15 + 4; 32–5; 33–3; 3–4) or to wild animals (17–6; 34 + 5; 39 0). They have thought about hunting (2–5) and believe cats will hunt given the opportunity (29 + 4; 9–2): “it's their nature to hunt; they're a cat you know, it's a predator and I think they should just be allowed to do what they want to do.” (WCP1). However, they don't believe this has significant impacts (12 0; 6 + 1; 16 + 4; 51–3). Liberationists are the least concerned by hunting behaviour (5 + 2; 41–5; 21–6) and are most likely to perceive this as positive (49 + 2; 31 0). Accordingly, they are ambivalent about their responsibility to manage hunting (60–1) and uncertain of effective techniques (61 0; 56 + 2; 20 0), believing that if cats hunt, owners just have to put up with this (55 + 3; 53 + 5). Liberationists oppose management that impedes cats' outdoor access (17–6; 22–3) and are concerned about keeping cats wholly indoors (1 + 3; 4–4; 8–3; 11–1; 44–1; 57 + 2), though they are relatively accepting of confinement at night (27 + 2).

5. Analysis B: wildlife conservation professionals

This analysis only included the 31 Q-sorts carried out by Wildlife Conservation Professionals (WCPs). We identified three factors that collectively explained 52.4 % of the overall variance. Three participants' sorts were not significantly associated with any factor and were excluded from this analysis (Fig. 3).

5.1. Active WCP

“You can do research about cat behaviour and find ways to reduce their hunting instinct when they're outside”

(WCP6)

All 16 WCP participants associated with this perspective were also associated with the *Conservationist* perspective in Analysis A. This perspective is characterised by strong concern about cats' hunting behaviour (5–6; 28–6; 43 + 5; 49–2) and its potential impacts on wildlife (2–5; 6 + 6; 12–3; 39 + 5 51 + 1). Some participants expressed feelings of guilt as they are trying to “conserve wildlife, but have cats, which is a bit of a contradiction in terms” (WCP18). Active WCPs believe that they have a responsibility to manage their pet's hunting behaviour (60 + 6; 53–3; 34–3; 25 + 4) and know how to do so effectively (61 + 4; 55–4): “I think there is a potential impact, but there's also lots of things you can do” (WCP14). They are relatively positive about belled collars (56 + 2; 48–3; 45–2) and some restrictions on cat ownership (14 + 2; 18 + 2; 59 + 3) or outdoor access (22 + 5; 50–5), including night confinement (20 + 3; 27 + 4). They are more ambivalent about permanent confinement (17 0; 44 + 1; 8–4; 57–2; 4 0). They don't express particular concern about the safety of roaming cats (32 0; 33 + 1; 36–2; 37–1).

5.2. Tolerant WCP

“If we're trying to stop cats [roaming and hunting] then we should just stop having cats really, but I would find that very hard to do, so maybe we just need to take it”

(WCP9)

Three of the seven WCP participants associated with this perspective were also associated with the *Liberationist* perspective and one with the *Conservationist* perspective in Analysis A. Three of the participants associated with this perspective were not associated with any factor in Analysis A. This perspective is more accepting of hunting as something that ‘cats do’ (34 + 4; 29 + 6; 5–1; 39 0) and which owners must, to

some extent, accept (53 + 2; 55 + 1; 43–3). Tolerant WCPs feel that cats should have free access to both the house and the outdoors (24 + 2; 50 + 2; 58 + 3) and have reservations about cat containment (4 0; 8–5; 17–5; 24 + 2; 26 0; 44 0; 57 0), extending to the acceptability of night confinement (20–1; 27 0). In other respects, this perspective shares some views with the Active WCP (above): it is somewhat concerned about cats' impacts on wildlife (6 + 3; 12–2), supports some regulation of cat ownership (14 + 3; 59 + 2), and feels some responsibility for managing hunting behaviour (60 + 2), supporting the use of belled collars (56 + 4; 48–2): “You can do things...like putting bells on collars...to try and reduce it... But...I wouldn't keep a cat indoors; I would allow it to roam.” (WCP4). However, they feel comparatively little responsibility for the safety of roaming cats (3–4; 15 + 3) and believe the benefits of roaming outweigh its risks (32–2; 33 0; 36–3; 37–3; 47 + 5).

5.3. Conflicted WCP

“I feel very conflicted, as you can gather. I know it's part of their natural [behaviour] but I don't, obviously, like that they do it.”

(WCP24)

Four of the five WCP participants associated with this perspective were also associated with the *Welfarist* perspective in Analysis A, and one was not associated with any factor. This perspective expresses the least concern about cats' hunting behaviour (5 0; 20–1) and impacts on wildlife (6 0; 12 + 2; 51–4; 26–5) and opposes restrictions on cat ownership or outdoor access that are primarily intended to manage hunting (14–6; 17–4). They perceive hunting as helpful in controlling rodent populations (7 + 4), but don't like the idea of prey suffering (39 + 5): “when [our cat] brings in rabbits every spring it is quite distressing for us and the rabbit, I'm sure, so we do our best to prevent it.” (WCP30). They feel some responsibility to manage hunting behaviour (60 + 4), especially if a cat hunts frequently (40 + 3) but may be uncertain of effective methods (61–1; 55 + 2; 56 + 1). This perspective is the most concerned (among WCPs) with cat safety, including while roaming (3 + 3; 33 + 5). These owners support outdoor access for cats (26–5; 27 + 6), but accept some regulation, such as confinement at night (27 + 6; 58 0; 50 0).

6. Analysis C: animal welfare professionals

This analysis only included the 32 Q-sorts carried out by Animal Welfare Professionals (AWPs). We identified three perspectives which collectively explained 51.3 % of the overall variance. Two sorts were not significantly associated with any perspective (Fig. 3).

6.1. Conflicted AWP

“I think it's a huge ethical dilemma... it causes everybody to have to think about the impact of human decisions on all kinds of animals, not only those that are in our own care but those that live wild as well.”

(AWP30)

12 of the 15 AWP participants associated with this perspective were also associated with the *Welfarist* perspective in Analysis A. Three participants were not associated with any perspective in Analysis A. This perspective is concerned with the welfare of both cats and wildlife. They dislike cats hunting (5–4; 28–5; 31–5) because it causes suffering (39 + 5), rather than because of concern for wildlife populations (6 0; 21–4; 26–4; 51–3). Beyond rescuing prey brought home (42 + 6), however, they are ambivalent about their responsibility and uncertain of their ability to manage cat hunting safely or effectively (60 0; 61–2; 55–1; 53 + 2; 19–2; 20 0; 22 + 1; 30 + 4; 17–5). They believe cats should have outdoor access (58 + 3; 47 + 3; 24 + 2) and express some concerns about keeping cats indoors (1 + 4; 8 + 1). However, they are also concerned about cats' safety while roaming (31 + 1; 33 + 5) and support

night confinement (27 + 5): “I worry about [roaming and hunting] but I think they need to do it... so what are you going to do?” (AWP7).

6.2. Active AWP

“If your cat is hunting a lot, there are things that you can do. So I think it's about owner behaviour to reduce that impact.”

(AWP29)

All nine of the AWP participants associated with this group were also associated with the *Welfarist* perspective in Analysis A. These owners are confident in their knowledge and ability to manage cats' hunting behaviour (61 + 5) and feel some responsibility to do so (60 + 2). They believe belled collars to be ineffective (56–5) and potentially unsafe (30 + 5; 48 + 2) but think that spending time with cats (19 + 6), and keeping them indoors overnight both help reduce hunting (20 + 2; 27 + 5). They are nevertheless not particularly concerned by cats hunting (5 + 2; 41–5; 43–1), by potential impacts on wildlife populations (6–1; 12 0; 25 + 1; 51–4), or on wild animal welfare (39 + 1): “There's lots of things you can do to limit [hunting] by stimulating them with play and things to... give them the sense that they are hunting without actually doing it. [Hunting] doesn't overly concern me.” (AWP14). While they think cats should have some outdoor access (58 + 3; 50 + 3) and that the benefits of roaming outweigh the risks to cats (47 + 3; 32–1; 33 0; 36–2; 37–3), they are not opposed to keeping cats indoors, provided they have enough stimulation (57–3; 44 + 4; 8 + 4). However, they disagree with indoor confinement that is primarily for the purpose of managing hunting (17–5; 22–3). They strongly support regulation of cat breeding (59 + 6).

6.3. Tolerant AWP

“I think [roaming and hunting are] natural and there's nothing that you can really do.”

(AWP11)

Five of the six AWP participants associated with this perspective were also associated with the *Liberationist* perspective in Analysis A and one was associated with the *Welfarist* perspective. These participants strongly believe that cats should have the right to roam freely outdoors (50 + 6; 58 + 6; 24 + 5), and that the benefits of roaming outweigh any risks to cats (47 + 5; 15 + 4), which they do not consider to be significant (32–2; 33–2; 36–1). They are not concerned about the effects of cats hunting on wildlife (6 0; 12 0; 21–5; 25 + 1; 51–2; 26–5), perceiving hunting as ‘just what cats do’ (34 + 5) and a positive sign of normal behaviour (49 + 3). They do not feel responsible for managing hunting (60–2), believing that owners can't stop this (55 + 3; 53 + 4): “my cat is a wild animal... it is not domesticated enough to have stopped hunting. It is a natural behaviour and I cannot as an owner manage my cat's hunting behaviour other than to lock it inside” (AWP33). Consistent with the emphasis on outdoor access, these owners are opposed to keeping cats indoors to prevent hunting (17–6; 22–4) and perceive confinement as cruel (57 + 3; 8–4; 4–6); they are, however, accepting of night confinement (27 + 3). They oppose restrictions on cat ownership (14–3), but support regulation of breeding (59 + 3).

7. Consensus and agreement

The above analyses highlight the distinctiveness of perspectives, both between and within groups of cat-owning wildlife conservation and animal welfare professionals. There were also, however, some areas of consensus and shared views. All perspectives from both groups agreed that cats should have some outdoor access, but that keeping cats in at night was acceptable (except B2 *Tolerant* WCPs [27 0], who support outdoor access but may have reservations about night confinement). All participants except B3 *Conflicted* WCPs (59 + 1: this indicates

uncertainty or no strong feeling), agreed that the breeding of cats should be regulated. All perspectives agreed that they had thought seriously about whether cats affected wildlife populations (2) and that if there were scientific evidence identifying a particular at risk due to cat predation, they would take managing hunting behaviour more seriously (25). All perspectives also agreed that they were happy to spend time playing with their cats (23), and that they would attempt to rescue any prey brought home (42).

8. Discussion

Our sampling of cat owners as individual stakeholders working in two professions engaged with the broad issue of animal management was helpful in identifying that these groups were not necessarily as far apart in their views and actions as might be assumed. An initial joint analysis of the two professional groups (Analysis A), indicated clear divergence of *Conservationist* and *Welfarist* perspectives along lines associated with professional interests, as might be expected, plus the existence of a third *Liberationist* view. However, when the two groups were analysed separately, there were diverse views expressed *within* professional groups, and both were shown to contain *active*, *tolerant* and *conflicted* perspectives on cat management (Table 2). There are clear differences between those who are *active* in managing their cat's behaviour (through various means and perhaps for different purposes);

Table 2

Descriptive summaries of perspectives identified through Q-methodological Analysis B (focusing on a sample of Wildlife Conservation Professionals) and C (focusing on a sample of Animal Welfare professionals), for comparative purposes.

	Active	Tolerant	Conflicted
Analysis B (Wildlife Conservation Professionals)	<ul style="list-style-type: none"> - Strong concern about cats hunting and impact on wildlife - Feel responsible for managing hunting behaviour - Positive about most management measures - Not strongly concerned with cat safety when roaming 	<ul style="list-style-type: none"> - Some concern about cat impacts on wildlife - Relatively accepting of hunting as ‘what cats do’ - Believe benefits of roaming outweigh risks - Reservations about cat containment, but support use of belled collars 	<ul style="list-style-type: none"> - Less concerned about cat impacts on wildlife, but dislike prey suffering - Hunting thought helpful for rodent control - Feel some responsibility for managing hunting, but uncertain of effective methods - Support outdoor access for cats, but accepting of some regulation
Analysis C (Animal Welfare Professionals)	<ul style="list-style-type: none"> - Not strongly concerned by impacts on wildlife - Feel some responsibility for managing cats and confident in ability to do so - Concerned about belled collars but employ alternate methods - Support outdoor access for cats, but not opposed to confinement with stimulation 	<ul style="list-style-type: none"> - Not concerned about cat impacts on wildlife - Do not feel responsible for managing hunting - Strongly believe in cats' right to roam and believe benefits of roaming outweigh risks - Oppose permanent confinement and ownership restrictions 	<ul style="list-style-type: none"> - Less concerned about cat impacts on wildlife populations, but dislike prey suffering - Ambivalent about responsibility and uncertain of ability to manage hunting - Support outdoor access for cats, but concerned for cat safety when roaming

those who are *tolerant* of hunting and prefer to allow cats as much freedom as possible; and those who feel *conflicted*, unable to reconcile their concerns with their actions, either through uncertainty (i.e. they don't know how to effectively prevent a cat hunting) or internal conflict (i.e. they dislike the cat causing suffering, but equally don't want the cat to suffer through confinement). Our analyses reveal some notable areas of convergence in the perspectives of, if not the drivers for action among, wildlife conservation and animal welfare professionals. Moreover, by analysing not just between- but also within-groups, greater nuance was revealed, with better insight into potential positive pathways for discussion and end points that might reduce the risks to cats and wildlife associated with cat roaming and hunting.

In the between-group Analysis A, *Conservationists* (a perspective constructed entirely from the responses of Wildlife Conservation Professionals) expressed concern for cat impacts on wildlife, and a willingness and sense of responsibility for managing cat behaviour. However, the *Welfarist* perspective (constructed primarily, but not exclusively, from the responses of Animal Welfare Professionals) felt less strongly about hunting and its management. Given the interest in animal welfare, this perspective did express concern about the suffering cats cause to wildlife, even where its adherents tended to prioritise cat wellbeing. Analysis A also highlighted a distinctive *Liberationist* perspective, that prioritised cats' freedom to roam outdoors and is not concerned about hunting behaviour. Individuals from both groups contribute to this perspective, and we identified a very similar viewpoint – which we termed the ‘freedom defender’ – in a broader national study of lay cat owners (Crowley et al., 2020b).

By contrast, the within-group Analyses B and C identified what we have described as *active*, *tolerant*, and *conflicted* viewpoints among both WCPs and AWP. *Active* perspectives in both samples support active management of cat behaviour, whether this was driven by objectives to reduce hunting of wildlife (in the case of *active* WCPs), or to improve cat safety and wellbeing (in the case of *active* AWP). *Tolerant* perspectives indicate some acceptance of hunting behaviour. Both *tolerant* WCP and *tolerant* AWP perspectives include participants who aligned with the *Liberationist* view in Analysis A, which prioritises outdoor access for cats. However, the *tolerant* AWP express little concern about hunting behaviour, viewing this as normal or even positive, whereas the *tolerant* WCP is concerned about cat impacts on wildlife but nevertheless prioritises cats' outdoor access. *Conflicted* perspectives involve clear tensions between reservations about cat hunting behaviour, stemming primarily from concern for the suffering of prey animals, and concern for cat welfare. Both *conflicted* WCPs and *conflicted* AWP supported outdoor access for cats but expressed concern about cat safety while roaming. The *conflicted* WCP feels greater responsibility to manage hunting behaviour, but also perceives hunting as helpful for controlling rodents. The *conflicted* AWP doesn't want cats to be hunting at all.

All perspectives (excepting the *active* WCP) placed importance on at least some outdoor access for cats and disagreed that stopping them hunting was sufficient reason to keep cats indoors. Cat owners in the UK are generally less positive about cat containment than owners in other regions (Hall et al., 2016; Foreman-Worsley et al., 2021), and allowing cats to roam outdoors is the norm in the UK. However, some owners do keep cats indoors for safety and welfare reasons (Crowley et al., 2020b; Foreman-Worsley et al., 2021), and there is some disagreement among cat advocates as to whether cats should be permitted to roam freely. Accordingly, different views on what constitutes good welfare and responsible pet ownership are evident among our AWP participants. The *active* AWP is accepting of confinement provided cats have sufficient stimulation, *tolerant* AWP firmly believe the benefits of outdoor access outweigh the risks, while *conflicted* AWP worry about both the safety of roaming cats and the welfare of indoor cats.

Cat confinement does not always mean permanent confinement, however, and it is notable that none of the perspectives opposed keeping cats indoors at night. There has, however, been comparatively little research into the effectiveness of overnight confinement as a specific

technique for reduction in hunting (compared to e.g. collar-mounted devices), though recent research has identified that restricted outdoor access (primarily night confinement) is associated with smaller home ranges, shorter daily distances travelled and shorter maximum distances travelled (Cecchetti et al., 2022). Ideally, future research would experimentally evaluate both the effectiveness and the welfare implications of regulating cats' outdoor access.

There was also clear agreement on regulation of breeding. This might be considered a ‘win-win’ solution from both *Conservationist* and *Welfarist* perspectives. Regulation of breeding (of owned cats), for example through mandated neutering and/or licensing, is already in place in some regions (e.g. the Cat Act 2011 in Western Australia) and in principle reduces both the number of cats in the environment and the number of unwanted litters, with associated benefits for both wildlife conservation and cat welfare. Regulating breeding of unowned cats is a widespread activity in the form of Trap-Neuter-Return (TNR), but its merits as a conservation action are disputed (Cecchetti et al., 2021b; Wald and Peterson, 2020).

When it comes to more directly managing hunting behaviour, the methods supported by *active* WCPs are more traditional (collars and confinement), whereas *active* AWP are concerned about the welfare implications of collars and suggest that spending time playing with cats can also reduce hunting. Since this study was conducted, we have experimentally identified that engaging in object play with cats, for at least five minutes a day, can reduce the amount of prey returned home (Cecchetti et al., 2021a). This suggests that analyses of cat behaviour can provide novel and valuable insights into cat management techniques, including techniques that may also benefit cat welfare.

Concern for individual animal welfare was found not to be limited to a concern for the welfare of cats. A key feature of the *conflicted* perspectives in Analyses B and C is a dislike of hunting by cats, founded in concern for the suffering this causes to individual wild animals, over and above concern for collectives (i.e. populations, species). This indicates that, although the ethical orientations of *Welfarists* and *Conservationists* may differ, *Welfarists* may still be troubled by their pet's hunting behaviour. Indeed, they are often willing to manage their cat's hunting to prevent the unnecessary suffering of wild animals. However, in much the same way that debates about population-level impacts revolve around the ‘naturalness’ (ecological role and significance) of cat predation, cat owners often reconcile the wildlife welfare implications of their cat's hunting by perceiving this as a ‘natural’ process, comparable with the suffering caused by predation within wildlife populations.

While all perspectives in the between-group Analysis A agreed that they had seriously considered the issue of cats' impacts on wildlife, concern for wildlife populations was much more evident among *Conservationists* than either *Welfarists* or *Liberationists*. Even among wildlife conservation professionals, however, there was ambivalence about the extent and severity of impacts. *Conservationist*, *Welfarist* and *Liberationist* perspectives all claimed that if there were more specific scientific evidence, they would take their cats' hunting behaviour more seriously. This reserved approach may have arisen because, despite extensive international evidence of cat impacts on wildlife, there is little UK-based documentation of cats having detrimental impacts on specific wildlife populations or species, and this message is not strongly promoted by UK conservation organisations (Palmer, 2022). We recognise – and think it important to emphasise – that this finding may be specific to the UK, however, as in other contexts cat impacts on wildlife are well documented (and cat containment is more widely promoted and practiced). Whether simply producing such evidence for the UK would actually change behaviour is questionable, however, given that ‘knowledge-deficit’ approaches to addressing complex conservation challenges have rarely been effective in other domains (see Owens, 2000; Simis et al., 2016; Toomey et al., 2017), including in the parallel debate about managing outdoor cats in the USA, where new information has been variably interpreted in relation to existing beliefs, biases and values (Wald and Peterson, 2020).

While different ethical orientations may seem to give a priori indications of division between wildlife conservation and animal welfare advocates, this research demonstrates that these differences, while conspicuous, are not straightforward. Closer analysis offers areas of convergence, and options for establishing constructive dialogue or mutually desirable actions and endpoints, even if the drivers for these differ. Fundamentally, wildlife conservation professionals may also be cat owners and have direct interests in animal welfare, of both cats specifically and the wild animals they hunt. Animal welfare professionals, although not necessarily convinced of cats' impacts on UK wildlife populations, often dislike their cats' hunting behaviour, and demonstrate both a concern for animal welfare beyond that of their own pets, and an interest in cat-friendly management practices.

These findings suggest that there may be value in changing the nature of the conversation around the management of owned domestic cats in the UK, from cautious avoidance of the issue (see Palmer, 2022) to strategic, collective work by interested organisations. A design feature of this study was that we worked only with cat-owning participants as key stakeholders, while much of the polarised debate on this issue is likely to arise between cat owners and non-owners. Nevertheless, given the nuances and contextual factors informing individuals' perspectives on this issue, and potential areas of agreement among professionals in key organisations, there are opportunities here for constructive engagement among wildlife conservation and animal welfare organisations. Rather than speaking in broad terms (e.g., whether the ethical priority should be individual animal welfare or wildlife populations) the most productive conversations are likely to focus on specifics, considering the risks associated with cats in the environment (including risks *to* and *from* cats), and the opportunities and challenges presented by different management approaches. There is also likely to be value in explicit discussions about desirable actions and future end points among different interest groups, whether these can be compatible, and how they might be achieved.

CRedit authorship contribution statement

Sarah Crowley: Conceptualisation, Methodology, Resources, Validation, Writing (Review & Editing), Visualisation, Supervision; **Lauren DeGrange:** Conceptualisation, Investigation, Formal Analysis, Writing (Original Draft); **David Matheson:** Conceptualisation, Investigation, Formal Analysis, Writing (Original Draft); **Robbie McDonald:** Conceptualisation, Methodology, Supervision, Writing (Review and Editing), Project Administration.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to thank all the participants and organisations involved in this research for their time and contributions. The study was funded by the College of Life and Environmental Sciences at the University of Exeter, with support to SLC and RAM from the 'Cats, cat owners and predation of wildlife' project supported by SongBird Survival. We are also grateful to the associated project advisory group for their comments and guidance on the original methodology.

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