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ORIGINAL PAPER

Relationships between wildlife value orientations and social identity

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Abstract
Wildlife value orientations (WVOs) and social identity are important elements in the wildlife domain and can predict attitudes toward wildlife and wildlife-management-related issues. Therefore, understanding the interrelations of WVOs and social identities is critical to successful wildlife conservation and management. We carried out on-site face-to-face surveys with representatives of four public groups with particular social identities in Greece—the general public ($n = 2392$), farmers ($n = 405$), hunters ($n = 124$) and farmers-hunters ($n = 158$)—to study variations in WVO types determined based on two basic WVOs, domination and mutualism: traditionalist (high domination, low mutualism), mutualist (low domination, high mutualism), pluralist (high domination and mutualism) and distanced (low domination and mutualism). The general public and farmers were more mutualist and distanced and less traditionalist and pluralist than hunters and farmers-hunters. Female members of the general public and farmers were more mutualist and less traditionalist than males. Younger members of the general public were more mutualist and less traditionalist than older members. WVO types did not significantly vary with residence (rural or urban) in any social identity group. Females, males and all age categories of the general public and farmers were more mutualist and distanced than traditionalist and pluralist. Our findings revealed similarities and differences in WVOs among key social identity groups, suggesting underlying differences in attitudes, and as such should be valuable for reaching consensus in critical but controversial wildlife conservation and management issues.

Keywords Beliefs · Cognitive hierarchy · Greece · Group affiliation · Questionnaire survey

Introduction

Basic beliefs refer to one's thoughts about general categories of objects, such as animals and forests. Value orientations are networks of basic beliefs that shape the more general values and provide contextual meaning to those values in relation to a particular domain, such as wildlife (Manfredo et al. 2009; Teel et al. 2010), and can predict differences in attitudes and behaviors because their strength varies among individuals (Rokeach 1973). The value orientation concept and theory were first used by Fulton et al. (1996) to develop an instrument for measuring basic beliefs concerning human–wildlife interactions. Two dimensions of wildlife value orientations (WVOs) were identified using this instrument; 'wildlife use' and 'wildlife protection.' Building upon this research, Manfredo et al. (2009) recognized that domination and mutualism are the two basic WVOs (these were previously referred to as the protection and use dimensions, respectively). Domination refers to prioritizing human well-being over wildlife and using wildlife for the benefit of humans, while mutualism refers to viewing wildlife as part of one's social community and deserving of rights and care, like humans.

Previous research has identified four WVO types based on domination and mutualism (Manfredo et al. 2009; Teel et al. 2005; Tetlock 1986). Traditionalists are characterized by high domination and low mutualism WVOs, believing that wildlife should be used for human benefit and human needs should take priority over wildlife protection. Mutualists have low domination and high mutualism values and view wildlife as part of one big family that should coexist in harmony and share similar rights. Traditionalist individuals are usually consumptive users of wildlife, supporting wildlife management and even practices involving the killing of animals. In contrast, mutualists show empathy toward wildlife,

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care about their well-being, and are not usually accepting of the suffering or killing of animals for any reason. Pluralists have high domination and mutualism orientations, which they interchangeably express depending on context-specific situations. Pluralists' behavior is hard to predict because they can behave either as traditionalists or as mutualists. Distanced individuals have low domination and mutualism WVOs and are thus not characterized by any particular interest in wildlife conservation and management.

WVOs have proved important predictors of public attitudes and behaviors toward wildlife and wildlife-related issues and important in describing differences in cultural thought (Manfredo 2008), and they have attracted many human dimensions researchers (e.g., Cerri et al. 2017; Eriksson et al. 2020; Gamborg and Jensen 2016a; Liordos et al. 2021; Vaske et al. 2011). As Western societies become more urbanized, they also shift from domination to mutualism values (Manfredo et al. 2020; Teel and Manfredo 2010). People living in cities are more disconnected from nature than rural residents and engage less in hunting and other outdoor activities, both consumptive and non-consumptive (Heberlein and Ericsson 2005; Liordos et al. 2020a, b). Few studies have examined the relationship of demographic characteristics with WVOs (Gamborg and Jensen 2016a, b; Liordos et al. 2021; Teel and Manfredo 2010; Vaske et al. 2001). Those studies found that younger, female, urban residents are usually more mutualists, while older, male, rural residents are usually more domination oriented.

Social identity is the outcome of the processes of social categorization, social comparison, and social identification. It is defined as an individual's knowledge of belonging to certain social groups, together with some emotional and valuational significance of that group membership (Tajfel and Turner 1986). Ehrhart et al. (2022) found that in groups with a strong social identity regarding wildlife management, individuals share the same attitude, while in groups with a weak social identity, individuals may have different attitudes. Hunters and farmers are among the groups involved in wildlife management issues that possess strong social identities (Ehrhart et al. 2022; van Eeden et al. 2020). Research from several countries (Byrd et al. 2017; Daigle et al. 2002; Ljung et al. 2012), including Greece (Raftogianni et al. 2022), reported that the great majority of hunters hunt for sport and consider their activity as a valuable management tool, at the same time rejecting hunting for meat or trophies. Based on such findings, we can assume that hunters are a group with a strong social identity regarding wildlife management.

Farmers are interested in wildlife management to protect their lives and properties and also to promote nature conservation (Frank et al. 2015; Kontsiotis et al. 2020; Liordos et al. 2017), and they are considered a group with a strong social identity with respect to these matters. The general public, excluding farmers and hunters, is a generalization used to describe the remaining sample here. Previous studies have mostly focused on the general public, while other social identity groups that are key to the practice of and decision making in wildlife conservation and management, especially farmers and hunters, have been less systematically studied (Gamborg and Jensen 2016b; Ehrhart et al. 2022). Farmers and hunters are more directly implicated in wildlife and wildlife-related issues due to their occupations and leisure activities than the general public (Heberlein and Ericsson 2005; Kontsiotis et al. 2020; Liordos et al. 2017). Farmers will generally accept any management action, even lethal ones, when wildlife species threaten their livelihoods (Frank et al. 2015; Liordos et al. 2017). In contrast, they will also purposely apply land sparing and wildlife-friendly farming to protect and increase biodiversity on their farms (Conover 1998; Crabb et al. 1998). Hunters have consistently been found to be more traditionalist and less mutualist, with their WVO types significantly differing from those of the general public (Ehrhart et al. 2022; Gamborg and Jensen 2016b). Hunters are consumptive users of wildlife resources who share a utilitarian disposition toward animals (Heberlein and Ericsson 2005; Kellert 1980) and are generally more supportive of lethal control for managing human–wildlife conflicts than other interest groups (Frank et al. 2015; Liordos et al. 2017). However, they also have a long tradition of helping to conserve wildlife, especially game species and their habitats, in many countries (Holsman 2000; Loveridge et al. 2007).

We have previously studied the WVOs of the Greek general public and their relationship with sociodemographic characteristics (Liordos et al. 2021). We found that mutualists were the most abundant, followed by the distanced, traditionalists, and pluralists. Also, the young, the more educated public, pet owners, and females were more mutualist than the more traditionalist old people, the less educated public, non-pet owners, and males. In the present study, we aim to explore the relationships of WVOs to social identity by including the general public group from the previous study and the farmer and hunter social identities. Relevant research comparing wildlife values and social identities is scarce (e.g., Bruskotter et al. 2019; Ehrhart et al. 2022; van Eeden et al. 2020), and none has included both the hunter and farmer identities. This study offers a close-up view of these associations in Greece for the first time and also allows for cross-national comparisons that are valuable in evidencing national specificities in the relationships between WVOs and social identity. The outcomes of our study and such comparisons should be useful for guiding successful decision making in wildlife management.

Following previous research that recognized farmers and hunters as groups with strong social identities and as important actors in wildlife conservation and management decision making and practice, similar to wildlife professionals

who are responsible for these matters (Ehrhart et al. 2022; Manfredo et al. 2009; Teel et al. 2010), and considering the scarcity of research combining these social identities, we identified four groups based on the farmer and/or hunter social identities: (1) the general public, including those who are neither farmers nor hunters, (2) farmers, (3) hunters, and (4) farmers-hunters. Our main aims were: (1) to assess the differences and similarities in WVO types among and within social identity groups, and (2) to examine whether gender, age and current residence affect the WVO types within each group.

Materials and methods

Sample collection

Greece has a population of 10,816,286 people. The 18–80 age interval (8,431,305 people), corresponding to the target age of our study, has a 51.4% female/48.6% male gender ratio and a 28.5%/37.1%/34.4% age ratio in the 18- to 34-, 35- to 54-, and 55- to 80-year-old age classes (Hellenic Statistical Authority 2011). The rural (people living in villages and towns with < 10,000 inhabitants)/urban (people living in towns with > 10,000 inhabitants) ratio is 21.0%/79.0% (United Nations, Department of Economic and Social Affairs, Population Division 2019). The proportion of farmers in the Greek adult population is 17.01% (Hellenic Statistical Authority 2016), while the proportion of hunters is 2.16% (Sokos 2019).

We collected data from on-site face-to-face surveys with adult Greek residents (aged 18–80) between March 2017 and September 2018. We carried out our survey in the 13 administrative regions of Greece (Fig. 1) by randomly selecting one city (> 100,000 inhabitants), one large town (10,000–100,000 inhabitants), one small town (2500–10,000 inhabitants), and two villages (< 2500 inhabitants) in each of the 13 regions. We visited these areas during open market

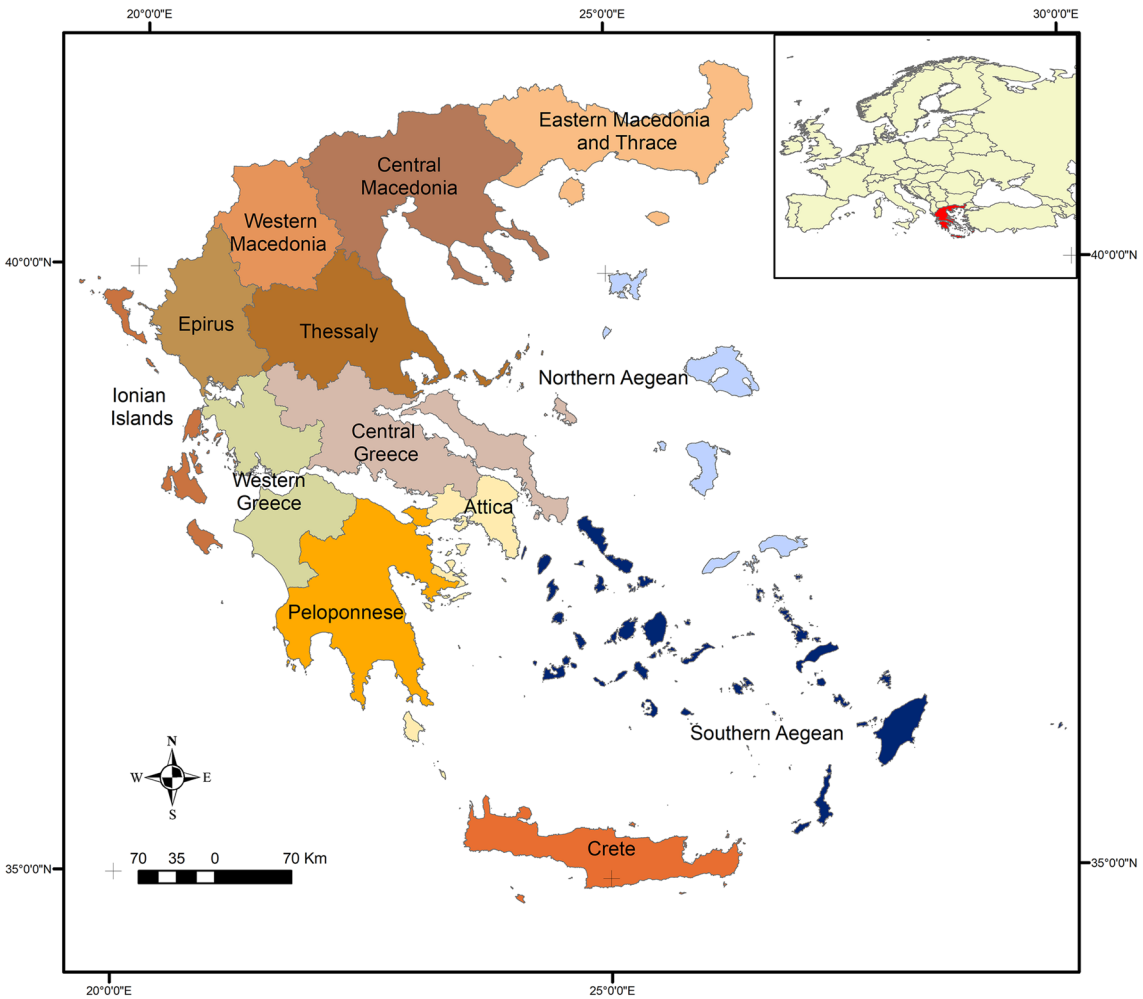

Fig. 1 Map of Greece showing the 13 regions from where wildlife value orientation data were collected

hours (9.00–15.00 and 17.00–21.00 from Monday to Saturday). Market streets in most neighborhoods in both poorer and wealthier areas were surveyed, aiming at the inclusion of participants of different socioeconomic status. We selected areas based on property quality due to a lack of spatial socioeconomic data, but for this reason we could not assess the representativeness of our sample in terms of socioeconomic status. The researcher (I.E.) asked every fifth person passing in front of her to participate in the survey by reading and responding to questions in the questionnaire, with the help of the researcher when needed (respondent-completed survey; Vaske 2019). When more than five people had passed before a questionnaire was completed, we selected the next available person upon completion. We also visited farmers' cooperatives and hunting clubs within the study area to ensure the inclusion of farmers and hunters in the sample. In order to achieve this, we randomly selected a farmers' cooperative and a hunting club in each of the 13 regions of Greece. After contacting the pertinent officials and obtaining their permission, we visited their premises during meetings and asked farmers and hunters to participate in our survey. It took respondents 30 min on average to complete the questionnaire.

Questionnaire design

The questionnaire consisted of two parts. In the first part, we asked survey participants about their social identity demographic characteristics. We asked participants if they were farmers or/and hunters, with possible answers being yes or no. We then assigned them to one of four social identity groups: (1) the general public (i.e., non-farmers and non-hunters), (2) farmers, (3) hunters, and (4) farmers-hunters. Hunters and farmers have strong social identities concerning wildlife management, while it has been shown that the general public includes many individuals without a particular interest in wildlife management and has a generally weak and not well-defined social identity (Ehrhart et al. 2022), although people with both strong (e.g., conservationists) or weak (e.g., elected councilors) views toward wildlife management may have been included in our sample. We examined three demographic characteristics: (1) gender (female or male), (2) age (in years), and (3) current residence [recorded as either rural (villages and towns < 10,000 inhabitants) or urban (towns > 10,000 inhabitants)].

In the second part, we assessed the two basic WVOs via 19 statements, following Jacobs et al. (2014). The first 10 statements assessed the domination WVO (including the appropriate use and hunting beliefs), while the next nine statements assessed the mutualism WVO (including the social affiliation and caring beliefs (see Table 1). Possible answers to the statements varied on a seven-point scale from 1 ("strongly disagree") to 7 ("strongly agree").

Data analysis

We used confirmatory factor analysis to examine if the 19 WVO statements followed theoretical constructs. We assessed the reliability of the constructs with Cronbach's alpha (α), with values greater than 0.7 showing high internal consistency (Nunnally 1978).

We created the WVO types by following the two-step procedure proposed by Teel et al. (2005) and Teel and Manfredo (2010). First, we calculated the mean scores for domination (mean of 10 statements) and mutualism (mean of nine statements) for each respondent. Then, we created the four WVO types based on their composite means of the domination and mutualism scores. Scores > 4.50 were considered as "high," while scores ≤ 4.50 were considered as "low" (Teel et al. 2005). We classified respondents as: (1) traditionalists (high domination and low mutualism scores), (2) mutualists (low domination, high mutualism), (3) pluralists (high scores on both WVOs), and (4) distanced (low scores on both WVOs).

We assessed the relationship of WVO types with social identity groups and with demographic characteristics by social identity group using contingency tables. We assessed the relationship of WVO types with each category of demographic characteristics (e.g., female and male for gender) by social identity group using chi-squared (χ^2) tests. We performed chi-squared tests and reliability analysis with SPSS Statistics and confirmatory factor analysis with SPSS AMOS statistical software (version 21.0, IBM Corp., 2012). The significance level was set at $\alpha = 0.05$.

Results

We collected a total of 3079 complete questionnaires (general public: 2392; farmers: 405; hunters: 124; farmers-hunters: 158), with 304 refusals (response rate 91%). Our sample's proportion of farmers (18.29%) was representative of Greece's population ($\chi_1^2 = 3.470$, $p = 0.059$), while the proportion of hunters was not (9.16%; $\chi_1^2 = 710.338$, $p < 0.001$). The general public sample was representative of Greece's population in terms of: gender ratio (50.8%/49.2% female/male in our sample; $\chi_1^2 = 0.064$, $p = 0.769$), age ratio (32.4%/34.9%/32.6% in our sample for the 18- to 34-, 35- to 54-, and >55-year-old age classes, respectively; $\chi_2^2 = 4.481$, $p = 0.106$), and current residence (rural/urban ratio 23.7%/76.3% in our sample; $\chi_1^2 = 2.554$, $p = 0.099$) (Liordos et al. 2021). Demographic data for farmers and hunters were not available for comparisons.

Confirmatory factor analysis supported the theoretical constructs of domination and mutualism WVOs, with standardized factor loadings being statistically significant at $p < 0.001$ and above the minimum criterion of 0.40 used to denote practical significance (Table 1). In addition, the

Table 1 Descriptive statistics, reliability and confirmatory factor analysis (CFA) of wildlife value orientation statements

Wildlife value orientation statements	CFA	Reliability analysis		
	Factor loadings [c]	Item total correlation	Alpha if item deleted	Cronbach's alpha
Domination				0.82
Appropriate use beliefs				
Humans should manage fish and wildlife populations so that humans benefit	0.69	0.44	0.74	0.77
The needs of humans should take priority over fish and wildlife protection	0.78	0.51	0.71	
It is acceptable for people to kill wildlife if they think it poses a threat to their life	0.63	0.49	0.72	
It is acceptable for people to kill wildlife if they think it poses a threat to their property	0.72	0.58	0.67	
It is acceptable to use fish and wildlife in research even if it may harm or kill some animals	0.66	0.44	0.68	
Fish and wildlife are on earth primarily for people to use	0.89	0.39	0.74	
Hunting beliefs				
We should strive for a world where there's an abundance of fish and wildlife for hunting and fishing	0.68	0.42	0.7	0.77
Hunting is cruel and inhumane to the animals[b]	0.56	0.58	0.55	
Hunting does not respect the lives of animals[b]	0.58	0.59	0.51	
People who want to hunt should be provided the opportunity to do so	0.71	0.42	0.67	
Mutualism				0.85
Social affiliation beliefs				
We should strive for a world where humans and fish and wildlife can live side by side without fear	0.56	0.46	0.73	0.76
I view all living things as part of one big family	0.64	0.6	0.67	
Animals should have rights similar to the rights of humans	0.81	0.53	0.71	
Wildlife are like my family and I want to protect them	0.82	0.61	0.65	
Caring beliefs				
I care about animals as much as I do other people	0.76	0.48	0.77	0.8
It would be more rewarding to me to help animals rather than people	0.52	0.43	0.76	
I take great comfort in the relationships I have with animals	0.68	0.68	0.74	
I feel a strong emotional bond with animals	0.81	0.72	0.71	
I value the sense of companionship I receive from animals	0.75	0.62	0.74	

[a]Variables were coded on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree)

[b]Item was reverse coded prior to analysis

[c]All t values for standardized factor loadings were significant at $p < 0.001$

internal consistency of the domination and mutualism WVOs was high (Cronbach's alpha ≥ 0.80).

WVO types varied among groups, as predicted ($p < 0.001$; Table 2). The general public and farmers were more mutualist and distanced than hunters and farmers-hunters. In contrast, hunters and farmers-hunters were more traditionalist and pluralist than the general public and farmers. WVO types also differed within the general public, farmers (both

Table 2 Wildlife value orientation types of the general public, farmers, hunters and farmers-hunters

Social identity	Wildlife value orientation type (%)				χ^2	P	Cramer's V
	Traditionalist	Mutualist	Pluralist	Distanced			
					164.163	< 0.001	0.151
General public ($n = 2392$)	17.9	41	10	31.1	290.391	< 0.001	0.238
Farmers ($n = 405$)	20.7	39.5	9.1	30.6	46.975	< 0.001	0.197
Hunters ($n = 124$)	48.4	16.9	25.8	8.9	20.705	< 0.001	0.236
Farmers-hunters ($n = 158$)	37.3	21.5	17.7	23.4	6.313	0.097	0.115

$p < 0.001$; both more mutualist and distanced than traditionalist and pluralist) and hunters ($p < 0.001$; more traditionalist and pluralist than mutualist and distanced) (Table 2). In contrast, WVOs did not differ within the farmers-hunters group ($p = 0.097$).

Female hunters were not sampled, so the relationship of WVOs with gender was assessed only for the general public and farmers (Table 3). There was a difference between genders in WVO types for both the general public and farmers (both $p < 0.001$). Females were more mutualist and less traditionalist than males. WVO types varied with age for the general public ($p = 0.006$) but not for the other groups (all $p \geq 0.433$). More specifically, younger members of the general public were more mutualist and less traditionalist than older members. WVO types did not vary with residence in any group (all $p \geq 0.285$).

Both female and male members of the general public and farmers were more mutualist and distanced than traditionalist and pluralist (all $p \leq 0.012$; Table 3). Also, all age categories were more mutualist and distanced than traditionalist and pluralist for the general public and farmers (all $p \leq 0.002$). In contrast, WVOs did not differ within the

Table 3 Wildlife value orientation types of the general public, farmers, hunters and farmers-hunters by gender, age and residence

Social identity	Wildlife value orientation type (%)				χ^2	*P*	Cramer's *V*
	Traditionalist	Mutualist	Pluralist	Distanced			
Gender							
General public					20.586	< 0.001	0.11
Female ($n = 1216$)	11.8	48.1	9.2	30.9	243.048	< 0.001	0.282
Male ($n = 1176$)	24.1	33.7	10.9	31.3	88.822	< 0.001	0.207
Farmers					16.299	0.001	0.201
Female ($n = 200$)	15.5	46.5	5.5	32.5	44.278	< 0.001	0.272
Male ($n = 205$)	25.9	32.7	12.7	28.8	10.925	0.012	0.133
Age							
General public					18.22	0.006	0.073
18–34 ($n = 776$)	11.9	51.5	11.3	25.3	147.673	< 0.001	0.287
35–54 ($n = 836$)	21.5	37.3	8.6	32.5	97.57	< 0.001	0.233
55–80 ($n = 780$)	20	34.4	10.3	35.4	77.864	< 0.001	0.226
Farmers					5.917	0.433	0.171
18–34 ($n = 104$)	19.2	48.1	7.7	25	17.891	< 0.001	0.239
35–54 ($n = 135$)	22.2	39.3	8.9	29.6	15.362	0.002	0.195
55–80 ($n = 166$)	20.5	34.3	10.2	34.9	16.181	< 0.001	0.18
Hunters					4.92	0.554	0.282
18–34 ($n = 33$)	48.5	21.2	21.2	9.1	5.132	0.162	0.228
35–54 ($n = 50$)	46	16	24	14	5.655	0.13	0.194
55–80 ($n = 41$)	51.2	14.6	31.7	2.4	12.74	0.005	0.322
Farmers-hunters					2.385	0.881	0.174
18–34 ($n = 43$)	34.9	25.6	16.3	23.3	1.524	0.677	0.109
35–54 ($n = 52$)	38.5	25	15.4	21.2	2.842	0.417	0.135
55–80 ($n = 63$)	38.1	15.9	20.6	25.4	3.261	0.353	0.131
Residence							
General public					2.493	0.477	0.038
Rural ($n = 568$)	20.4	40.8	12	26.8	50.694	< 0.001	0.394
Urban ($n = 1,824$)	17.1	41	9.4	32.5	245.255	< 0.001	0.226
Farmers					3.787	0.285	0.097
Rural ($n = 304$)	22	37.5	10.2	30.3	28.615	< 0.001	0.177
Urban ($n = 101$)	16.8	45.5	5.9	31.7	20.308	< 0.001	0.259
Hunters					0.616	0.893	0.07
Rural ($n = 65$)	49.2	15.4	27.7	7.7	12.675	0.005	0.255
Urban ($n = 59$)	47.5	18.6	23.7	10.2	8.362	0.036	0.217
Farmers-hunters					2.156	0.541	0.117
Rural ($n = 90$)	40	18.9	20	21.1	4.676	0.197	0.132
Urban ($n = 68$)	33.8	25	14.7	26.5	2.743	0.433	0.116

hunters and farmers-hunters groups (all $p \geq 0.130$) except for older hunters, who were more traditionalist and pluralist than mutualist and distanced ($p = 0.005$). Both rural and urban members of the general public and farmers were more mutualist and distanced than traditionalist and pluralist ($p \leq 0.001$), while, in contrast, both rural and urban hunters were more traditionalist and pluralist than mutualist and distanced (both $p \leq 0.036$). WVOs did not differ within rural and urban farmers-hunters (both $p \geq 0.197$).

Discussion

The general public and farmers were more mutualist and distanced than hunters and farmers-hunters, who were more traditionalist and pluralist. Also, differences in WVO types were large for all groups, except for farmers-hunters, who participated in similar proportions in all types. Furthermore, the proportions of farmers-hunters fell between those of farmers and hunters, although they were generally closer to those of hunters. Our findings for the general public agree with previous studies from the United States (Manfredo et al. 2009, 2020; Teel et al. 2005; Teel and Manfredo 2010) and other, especially European, countries (Gamborg and Jensen 2016a; Jacobs 2007; Liordos et al. 2021) that reported a prevalence of mutualist, mainly, and distanced WVOs among the public. Also, studies from 19 western states (Manfredo et al. 2009; Teel et al. 2005; Teel and Manfredo 2010) and all 50 states (Manfredo et al. 2020) in the USA reported higher percentages of mutualist and distanced residents in the more urban than in the more rural states. Urban residents tend to place lower value on consumptive activities (e.g., logging, mining, hunting, fishing) and higher value on nature and wildlife conservation issues, while a considerable proportion may be disconnected, showing little interest in nature and wildlife (Liordos et al. 2020a, b; Teel and Manfredo 2010). Since Greece is a highly urbanized country (United Nations, Department of Economic and Social Affairs, Population Division 2019), a trend reflected in our sample, we expected the prevalence of mutualism-oriented values among Greek residents (Liordos et al. 2021).

Gamborg and Jensen (2016b) found, similar to our study, that hunters were more traditionalist and pluralist than mutualist and distanced. They were also more traditionalist and pluralist than other groups such as landowners and the general public. In modern Western societies, hunters regard hunting as an activity offering opportunities for excitement and exercise, to enjoy nature, to learn about wildlife, to reinforce relationships with friends and family, and to reduce everyday stress (Daigle et al. 2002; Gamborg and Jensen 2018; Liordos 2014; Raftogianni et al. 2022). Fishbein and Ajzen (2009) and van Eeden et al. (2020) reported that social identities can directly influence attitudes and that identities can be more strongly linked to attitudes than general values. Ehrhart et al. (2022) found that in groups with a strong social identity with regard to wildlife management, such as foresters and hunting tenants, their attitudes were not related to WVO types, but social identity directly determined the assessment of red deer (*Cervus elaphus*) and its management. Research has also shown that hunters are supporters of wildlife management, especially when it positively affects their favorite game, with a high consensus among them (Frank et al. 2015; Kontsiotis et al. 2020; Liordos et al. 2017, 2020a, b). In contrast, Ehrhart et al. (2022) found that in groups with a weak social identity, such as local citizens and councilors, identity was not an important predictor of attitudes, but attitudes differed among WVO types; these findings are similar to those reported for the general public (Glas et al. 2019; Keener-Eck et al. 2020) and landowners (Cerri et al. 2017; Gamborg et al. 2019).

Farmers share common goals and interests and are interested in wildlife management when these interests are at stake (Frank et al. 2015; Kontsiotis et al. 2020; Liordos et al. 2020a, b; van Eeden et al. 2019). However, the goals and interests of farmers are not usually directed toward wildlife; also, they are not consumptive users of wildlife and thus might or might not have a special interest in wildlife. This might suggest a weaker social identity and group coherence where wildlife issues are concerned. Under this framework, we expected that farmers would express beliefs more similar to the general public, as was the case in our study. Indeed, a stronger social identity and group affiliation of hunters than farmers, at least pertaining to wildlife, was suggested by our findings that the WVO types of farmers-hunters were more similar to those of hunters than farmers.

Although both sexes were more mutualist and distanced than traditionalist and pluralist, female farmers and members of the general public were more mutualist and less traditionalist than males. Gamborg and Jensen (2016b) also found that females were more mutualist and less traditionalist than males among groups such as landowners, hunters, and the general public. Other studies also confirmed that females are more mutualism oriented while males are more domination oriented (Jacobs 2007; Teel and Manfredo 2010). In general, females show greater empathy toward non-human life, are more sensitive to animal welfare issues, and are more supportive of wildlife conservation than males (Kellert 1980; Teel and Manfredo 2010; Vaske et al. 2011).

In our sample, members of the general public became more traditionalist with age. In contrast, the other social identity groups' WVO types did not vary greatly with age. Younger people generally show higher empathy toward animals, are proponents of wildlife conservation, and are more mutualist than traditionalist than older people (Gamborg and Jensen 2016b; Kellert 1980; Vaske et al. 2011). The absence of differences in WVO types with age within the farmer,

hunter, and farmer-hunter groups might be explained by their stronger social identity and group affiliation than those of the general public. Farmers and hunters pursue common goals and interests, which, for hunters, relate more directly to wildlife and wildlife-related issues (Daigle et al. 2002; Frank et al. 2015; Gamborg and Jensen 2018; Kontsiotis et al. 2020; Liordos et al. 2020a, b). The combination of a strong group affiliation and an interest in wildlife, which emerges early in life and is usually passed from generation to generation (Gamborg and Jensen 2018; Larson et al. 2014; Liordos 2014), results in similar worldviews toward wildlife and nature among group members, irrespective of age (Zinn et al. 2002).

Although we attributed the prevalence of mutualist and distanced WVO types among the Greek general public to the high urbanization of Greece, our findings did not reveal significant variation between residence categories for any of the social identity groups, which is in contrast with other studies (Manfredo et al. 2009; Teel et al. 2005; Teel and Manfredo 2010; Vaske et al. 2011). In agreement with our findings, Gamborg and Jensen (2016b) also did not find differences in WVO types among rural and urban members of the general public, hunters, and landowners. With 79% of its population living in cities, Greece is a highly urbanized country (median level of urbanization in Europe and North America: 74%; the highest is in Belgium 98% and the lowest is in Romania 54%; United Nations, Department of Economic and Social Affairs, Population Division 2019). As cities constantly expand, most rural areas become near to smaller or larger cities, giving rural residents the opportunity to participate in and adopt more urban lifestyles. So, we argue that rural people also adopt more "urban-like" mutualist values, an explanation also offered by Gamborg and Jensen (2016b) for the Danish public. The absence of differences in WVO types among rural and urban farmers and hunters could be further explained by their strong social identities and group affiliations, which have been associated with similar beliefs and attitudes toward wildlife and wildlife-related issues (Daigle et al. 2002; Ehrhart et al. 2022; Gamborg and Jensen 2016b, 2018; Liordos 2014).

We used on-site face-to-face surveys because we did not have access to reliable lists for selecting a representative sample for all the country. Further, our selected type of survey allowed high response rates, enabled us to reach persons not on a contact list, gave respondents the chance to ask researchers for clarification of confusing questions, and allowed researchers to encourage respondents to complete all questions (i.e., avoided item nonresponse; Vaske 2019). We also tried to deal with the limitations of face-to-face surveys and reduce biases. We eliminated inter-researcher bias by using one researcher to collect our sample. Because survey participants, although anonymous, might have given their perceived socially acceptable answers, especially to the more controversial domination-related items (social desirability bias), we selected the respondent-completed method and informed each participant that they could insert their questionnaire randomly into a briefcase among other completed questionnaires. Although we randomly selected several areas in each region of Greece, the generalization of our results to the population level should consider coverage bias. The general public's gender, age, and current residence ratios and the proportions of farmers in our sample did not differ from those of the total population. However, the proportions of hunters were different from that in the total population, and we could not compare the distributions of sociodemographic characteristics in the farmer and hunter groups because population-level data were not available.

Conclusions

The successful conservation of a threatened wildlife population and the management of the negative impacts of wildlife on human interests or the environment are not possible without public consensus (Redpath et al. 2015). Our findings showed that WVO types differ among social identity groups and among demographic variables within groups. We should incorporate such differences into conservation and management plans, considering that mutualists are generally more supportive of wildlife conservation and non-lethal management strategies than traditionalists (Ehrhart et al. 2022; Keener-Eck et al. 2020; Kontsiotis et al. 2021; Schroeder et al. 2022; van Eeden et al. 2019). Further, all our social identity groups held all WVO types. Social identities guide values, ideologies, beliefs, and attitudes (Tajfel and Turner 1986; van Eeden et al. 2020). Relevant research has shown that in groups with strong social identities, such as foresters and hunting tenants, the attitudes toward specific wildlife management issues did not differ among members of the group, despite the presence of different WVOs (Bruskotter et al. 2019; Ehrhart et al. 2022; van Eeden et al. 2019). In contrast, these studies found that in groups with weak social identities, such as the general public, councilors, and forest owners, attitudes were not associated with identities but with different WVOs. Our findings suggested a stronger social identity among hunters, as the values of farmers-hunters were more similar to those of hunters, while those of farmers were more similar to the general public—a group with a weak social identity and lacking shared common goals and interests. These findings emphasize the need to couple WVOs with social identity to help predict the attitudes of specific groups toward a specific wildlife conservation or management issue. In doing so, we will be able to better predict public attitudes and design successful wildlife conservation and management plans.

Hunters and farmers are among the key social identity groups in wildlife conservation and management. However, future research should also examine and compare the WVOs of other wildlife-related social identity groups, such as professional wildlife managers, natural resource agency representatives, conservationists, and environmental non-governmental organizations (Gamborg and Jensen 2016b). Research should further investigate the underlying reasons for the absence of a rural–urban divide in WVOs and also examine other sociodemographic factors that have been found to significantly affect public beliefs, such as income and educational level (Gamborg and Jensen 2016b; Liordos et al. 2021; Manfredo et al. 2009; Teel et al. 2005; Teel and Manfredo 2010).

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Data availability The datasets used in the study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Research involving human participants The study was conducted according to the guidelines of the Declaration of Helsinki, and approval for the study was granted by the Research and Academic Committee of the International Hellenic University (TEI-EMT-121.2017).

Informed consent We sought informed consent from all the survey participants and maintained anonymity at all the stages of the research.

Consent for publication All authors permitted the publication of the article.

References

Ambrosius FHW, Kramer MR, Spiegel A, Bokkers EAM, Bock BB, Hofstede GJ (2022) Diffusion of organic farming among Dutch pig farmers: an agent-based model. Agric Syst 197:103336. https://doi.org/10.1016/j.agsy.2021.103336

Bruskotter JT, Vucetich JA, Dietsch A, Slagle KM, Brooks JS, Nelson MP (2019) Conservationists' moral obligations toward wildlife: values and identity promote conservation conflict. Biol Conserv 240:108296. https://doi.org/10.1016/j.biocon.2019.108296

Byrd E, Lee JG, Widmar NJO (2017) Perceptions of hunting and hunters by US respondents. Animals 7:83. https://doi.org/10.3390/ani7110083

Cerri J, Mori E, Vivarelli M, Zaccaroni M (2017) Are wildlife value orientations useful tools to explain tolerance and illegal killing of wildlife by farmers in response to crop damage? Eur J Wildl Res 63:70. https://doi.org/10.1007/s10344-017-1127-0

Conover MR (1998) Perceptions of American agricultural producers about wildlife on their farms and ranches. Wildl Soc Bull 26:597–604. https://www.jstor.org/stable/3783775

Crabb J, Firbank L, Winter M, Parham C, Dauven A (1998) Set-aside landscapes: farmer perceptions and practices in England. Landsc Res 23:237–254. https://doi.org/10.1080/01426399808706543

Daigle JJ, Hrubes D, Ajzen I (2002) A comparative study of beliefs, attitudes, and values among hunters, wildlife viewers, and other outdoor recreationists. Hum Dimens Wildl 7:1–19. https://doi.org/10.1080/108712002753574756

Ehrhart S, Stühlinger M, Schraml U (2022) The relationship of stakeholders' social identities and wildlife value orientations with attitudes toward red deer management. Hum Dimens Wildl 27:69–83. https://doi.org/10.1080/10871209.2021.1885767

Eriksson L, Johansson M, Månsson J, Redpath S, Sandström C, Elmberg J (2020) The public and geese: a conflict on the rise? Hum Dimens Wildl 25:421–437. https://doi.org/10.1080/10871209.2020.1752420

Fishbein M, Ajzen I (2009) Predicting and changing behavior: the reasoned action approach. Psychology Press (Taylor & Francis), New York

Frank B, Monaco A, Bath AJ (2015) Beyond standard wildlife management: a pathway to encompass human dimension findings in wild boar management. Eur J Wildl Res 61:723–730. https://doi.org/10.1007/s10344-015-0948-y

Fulton DC, Manfredo MJ, Lipscomb J (1996) Wildlife value orientations: a conceptual and measurement approach. Hum Dimens Wildl 1:24–47. https://doi.org/10.1080/10871209609359060

Gamborg C, Jensen FS (2016a) Wildlife value orientations: a quantitative study of the general public in Denmark. Hum Dimens Wildl 21:34–46. https://doi.org/10.1080/10871209.2015.1098753

Gamborg C, Jensen FS (2016b) Wildlife value orientations among hunters, landowners, and the general public: A Danish comparative quantitative study. Hum Dimens Wildl 21:328–344. https://doi.org/10.1080/10871209.2016.1157906

Gamborg C, Jensen FS, Sandøe P (2018) Killing animals for recreation? A quantitative study of hunters' motives and their perceived moral relevance. Soc Nat Resour 31:489–502. https://doi.org/10.1080/08941920.2017.1377332

Gamborg C, Lund JF, Jensen FS (2019) Landowners' wildlife value orientations, attitudes and behaviour in relation to game management practices. Eur J Wildl Res 65:179. https://doi.org/10.1007/s10344-018-1245-3

Glas ZE, Getson JM, Prokopy LS (2019) Wildlife value orientations and their relationships with mid-size predator management. Hum Dimens Wildl 24:418–432. https://doi.org/10.1080/10871209.2019.1622820

Heberlein TA, Ericsson G (2005) Ties to the countryside: accounting for urbanites attitudes toward hunting, wolves, and wildlife. Hum Dimens Wildl 10:213–227. https://doi.org/10.1080/10871200591003454

Hellenic Statistical Authority (2011) Population census 2011 (in Greek). http://www.statistics.gr/portal/page/portal/ESYE/PAGE-census2011. Accessed 7 March 2023

Hellenic Statistical Authority (2016) Farm holdings survey 2016 (in Greek). https://www.statistics.gr/el/statistics/-/publication/SPG12/-. Accessed 7 March 2023

Holsman RH (2000) Goodwill hunting? Exploring the role of hunters as ecosystem stewards. Wildl Soc Bull 28:808–816. https://www.jstor.org/stable/3783835

Jacobs MH (2007) Wildlife value orientations in the Netherlands. Hum Dimens Wildl 12:359–365. https://doi.org/10.1080/10871200701555345

Jacobs MH, Vaske JJ, Sijtsma MTJ (2014) Predictive potential of wildlife value orientations for acceptability of management interventions. J Nat Conserv 22:377–383. https://doi.org/10.1016/j.jnc.2014.03.005

Keener-Eck LS, Morzillo AT, Christoffel RA (2020) A comparison of wildlife value orientations and attitudes toward timber rattlesnakes (*Crotalus horridus*). Hum Dimens Wildl 25:47–61. https://doi.org/10.1080/10871209.2019.1694108

Kellert S (1980) American's attitudes toward and knowledge of animals: an update. Int J Study Anim Prob 1:87–119

Kontsiotis VJ, Triantafyllidis A, Telidis S, Eleftheriadou I, Liordos V (2021) The predictive ability of wildlife value orientations for mammal management varies with species conservation status and provenance. Sustainability 13:11335. https://doi.org/10.3390/su132011335

Kontsiotis VJ, Vadikolios G, Liordos V (2020) Acceptability and consensus for the management of game and non-game crop raiders. Wildl Res 47:296–308. https://doi.org/10.1071/WR19083

Larson LR, Stedman RC, Decker DJ, Siemer WF, Baumer MS (2014) Exploring the social habitat for hunting: Toward a comprehensive framework for understanding hunter recruitment and retention. Hum Dimens Wildl 19:105–122. https://doi.org/10.1080/10871209.2014.850126

Liordos V (2014) Sociodemographic analysis of hunters' preferences: a Greek hunting club perspective. Zool Ecol 24:389–396. https://doi.org/10.1080/21658005.2014.972043

Liordos V, Foutsa E, Kontsiotis VJ (2020a) Differences in encounters, likeability and desirability of wildlife species among residents of a Greek city. Sci Total Environ 739:139892. https://doi.org/10.1016/j.scitotenv.2020.139892

Liordos V, Kontsiotis VJ, Eleftheriadou I, Telidis S, Triantafyllidis A (2021) Wildlife value orientations and demographics in Greece. Earth 2:457–467. https://doi.org/10.3390/earth2030027

Liordos V, Kontsiotis VJ, Emmanouilidou F (2020b) Understanding stakeholder preferences for managing red foxes in different situations. Ecol Process 9:20. https://doi.org/10.1186/s13717-020-00224-x

Liordos V, Kontsiotis VJ, Georgari M, Baltzi K, Baltzi I (2017) Public acceptance of management methods under different human–wildlife conflict scenarios. Sci Total Environ 579:685–693. https://doi.org/10.1016/j.scitotenv.2016.11.040

Ljung PE, Riley SJ, Heberlein TA, Ericsson G (2012) Eat prey and love: game-meat consumption and attitudes toward hunting. Wildl Soc Bull 36:669–675. https://doi.org/10.1002/wsb.208

Loveridge AJ, Reynolds JC, Milner-Gulland EJ (2007) Does sport hunting benefit conservation? In: Macdonald DW, Service K (eds) Key topics in conservation biology. Oxford University Press, Oxford, pp 224–241

Manfredo MJ (2008) Who cares about wildlife? Social science concepts for exploring human-wildlife relationships and conservation issues. Springer, New York

Manfredo MJ, Teel TL, Don Carlos AW, Sullivan L, Bright AD, Dietsch AM, Bruskotter J, Fulton D (2020) The changing sociocultural context of wildlife conservation. Conserv Biol 34:1549–1559. https://doi.org/10.1111/cobi.13493

Manfredo MJ, Teel TL, Henry KL (2009) Linking society and environment: a multilevel model of shifting wildlife value orientations in the Western United States. Soc Sci Q 90:407–427. https://doi.org/10.1111/ssqu.2009.90.issue-2

Nunnally JC (1978) Psychometric theory, 2nd edn. McGraw-Hill, New York

Raftogianni G, Kontsiotis VJ, Liordos V (2022) Wildlife knowledge and attitudes toward hunting: a comparative hunter–non-hunter analysis. Sustainability 14:14541. https://doi.org/10.3390/su142114541

Redpath SM, Bhatia S, Young J (2015) Tilting at wildlife: reconsidering human–wildlife conflict. Oryx 49:222–225. https://doi.org/10.1017/S0030605314000799

Rokeach M (1973) The nature of human values. Free Press, New York

Schroeder SA, Landon AC, Fulton DC, McInenly LE (2022) On the multiple identities of stakeholders in wolf management in Minnesota, United States. Front Ecol Evol 10:798795. https://doi.org/10.3389/fevo.2022.798795

Sokos CK (2019) The disappearance of Greek hunters: predicting hunting licences (in Greek). https://www.ihunt.gr/%CE%B7-%CE%B5%CE%BE%CE%B1%CF%86%CE%AC%CE%BD%CE%B9%CF%83%CE%B7-%CF%84%CF%89%CE%BD-%CE%B5%CE%BB%CE%BB%CE%AE%CE%BD%CF%89%CE%BD-%CE%BA%CF%85%CE%BD%CE%B7%CE%B3%CF%8E%CE%BD-%CF%80%CF%81%CF%8C%CE%B2%CE%BB/. Accessed 07 March 2023

Tajfel H, Turner JC (1986) The social identity of intergroup behavior. In: Austin WG, Worchel S (eds) Psychology of intergroup relations. Nelson-Hall, Chicago, pp 7–24

Teel T, Dayer A, Manfredo MJ, Bright A (2005) Regional results from the research project entitled "Wildlife Values in the West" (Project Rep. No. 58). Project Report for the Western Association of Fish and Wildlife Agencies. Colorado State University. Human Dimensions in Natural Resources Unit, Fort Collins

Teel TL, Manfredo MJ (2010) Understanding the diversity of public interests in wildlife conservation. Conserv Biol 24:128–139. https://doi.org/10.1111/j.1523-1739.2009.01374.x

Teel TL, Manfredo MJ, Jensen FS, Buijs AE, Fischer A, Riepe C, Jacobs MH (2010) Understanding the cognitive basis for human-wildlife relationships as a key to successful protected-area management. Int J Sociol 40:104–123. https://doi.org/10.2753/IJS0020-7659400306

Tetlock PE (1986) A value pluralism model of ideological reasoning. J Pers Soc Psychol 50:819–827. https://doi.org/10.1037/0022-3514.50.4.819

United Nations, Department of Economic and Social Affairs, Population Division (2019) World urbanization prospects: the 2018 revision (ST/ESA/SER.A/420). United Nations, New York. https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf. Accessed 7 March 2023.

van Eeden LM, Newsome TM, Crowther MS, Dickman CR, Bruskotter J (2019) Social identity shapes support for management of wildlife and pests. Biol Conserv 231:167–173. https://doi.org/10.1016/j.biocon.2019.01.012

van Eeden LM, Slagle K, Crowther MS, Dickman CR, Newsome TM (2020) Linking social identity, risk perception, and behavioral psychology to understand predator management by livestock producers. Restor Ecol 28:902–910. https://doi.org/10.1111/rec.13154

Vaske JJ (2019) Survey research and analysis, 2nd edn. Venture, State College

Vaske JJ, Donnelly MP, Williams DR, Jonker S (2001) Demographic influences on environmental value orientations and normative beliefs about National Forest management. Soc Nat Resour 14:761–776. https://doi.org/10.1080/089419201753210585

Vaske JJ, Jacobs MH, Sijtsma TJ (2011) Wildlife value orientations and demographics in the Netherlands. Eur J Wildl Res 57:1179–1187. https://doi.org/10.1111/soru.12271

Zinn HC, Manfredo MJ, Barro SC (2002) Patterns of wildlife value orientations in hunters' families. Hum Dimens Wildl 7:147–162. https://doi.org/10.1080/10871200260293324