



Human Dimensions of Wildlife

An International Journal

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/uhdw20>

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To cite this article: Louise Eriksson , Maria Johansson , Johan Månsson , Steven Redpath ,
Camilla Sandström & Johan Elmberg (2020) The public and geese: a conflict on the rise?, Human
Dimensions of Wildlife, 25:5, 421-437, DOI: [10.1080/10871209.2020.1752420](https://doi.org/10.1080/10871209.2020.1752420)

To link to this article: <https://doi.org/10.1080/10871209.2020.1752420>



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Published online: 16 Apr 2020.



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The public and geese: a conflict on the rise?

Louise Eriksson ^{a,b}, Maria Johansson^c, Johan Månsson^d, Steven Redpath^e,
Camilla Sandström^f, and Johan Elmberg^b

^aDepartment of Geography, Umeå University, Umeå, Sweden; ^bDepartment of Environmental Science and Bioscience, Kristianstad University, Kristianstad, Sweden; ^cEnvironmental Psychology, Department of Architecture and Built Environment, Lund University, Lund, Sweden; ^dGrimsö Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences (SLU), Riddarhyttan, Sweden; ^eSchool of Biological Sciences, Zoology Building, University of Aberdeen, Aberdeen, UK; ^fDepartment of Political Science, Umeå University, Umeå, Sweden

ABSTRACT

Wild geese are increasing in agricultural and urban settings across Europe, leading to widespread human – geese interactions. This study examined how the public's acceptance of geese (attitude and acceptance capacity) varied depending on place dimensions, interactions with geese in different settings (place-based experience), and psychological factors, including wildlife value orientations, beliefs about the ecosystem services and disservices geese provide, and emotions. A survey was conducted in two municipalities with large goose populations in Sweden; Kristianstad and Örebro ($n = 898$). Results revealed a favorable view of the occurrence of geese, although a substantial share believed the number of geese was too high. Place-based experiences of geese were correlated with acceptance (e.g., more experience on beaches was associated with a negative attitude) and the importance of psychological factors for acceptance was confirmed. The study highlights the need to consider the public's experiences of geese for sustainable goose management.

KEYWORDS

Wild geese; public acceptance; place-based experiences; cognitions; emotions

Introduction

Conflicts over wildlife management are influenced by environmental, social, and individual factors (e.g., land use, social (in)equalities, value orientations; (Bruskotter & Wilson, 2014; Dickman, 2010; Teel et al., 2010). Migratory species constitute particular challenges for management since they may travel long distances and cross country borders. In Europe, several species of wild geese, including the graylag goose (*Anser anser*) and barnacle goose (*Branta leucopsis*), have increased dramatically since the 1930s (Fox & Madsen, 2017). This is largely due to hunting control, conservation efforts, and intensified agriculture providing high quality food for geese. Geese provide various benefits to humans (i.e., ecosystem services) such as nutrient cycling and stimulation of plant productivity, recreational hunting, meat, esthetic experience, and ecotourism (Green & Elmberg, 2014). However, the super-abundance of some geese has also led to over-grazing and impacts on ecosystems, and it is associated with several “ecosystem disservices,” such as crop damage, fouling on beaches and in parks, compromised air safety, contamination of freshwater, degradation of natural vegetation, and concern about spread of disease

CONTACT Louise Eriksson  louise.eriksson@umu.se  Department of Geography, Umeå University, Umeå SE-901 87, Sweden

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(Bakker et al., 2018; Buij et al., 2017; Fox et al., 2017). Notably, what constitute a service or disservice partially depends on who makes the evaluation leading to different assessments by stakeholder groups (Buij et al., 2017).

With more geese close to humans, more human – geese interactions can be anticipated among the general public. However, there is a gap in understanding how external conditions and wildlife interactions may contribute to the formation of the public's acceptance of geese. Previous studies from Scotland showed that the general public has a favorable view of the conservation of geese (Hanley et al., 2003; MacMillan et al., 2004), although a more recent study from the Netherlands found that approximately half of respondents in the general public supported lethal control when geese damaged agricultural crops (Sijtsma et al., 2012). Whereas the public's acceptance of other wildlife such as large carnivores (e.g., wolf, bears, lions) has been given ample consideration (e.g., Dressel et al., 2015; Eriksson et al., 2015; Majić et al., 2011; Vaske, 2018), the public's acceptance of geese has rarely been addressed directly. An understanding of whether more frequent experience of geese in different places is associated with higher or lower levels of acceptance can provide useful insights to improve the understanding and mitigation of potential future conflicts. This article, therefore, examined the role of place dimensions, place-based experiences, beliefs, and emotions in the acceptance of geese.

Conceptual Framework

People's *acceptance of wildlife* has generally been conceptualized in two ways. First, it has been examined in terms of an attitude, reflecting an evaluation ranging from negative to positive, such as from like to dislike, love to hate, or in favor to against (Dressel et al., 2015). Second, it has been examined in terms of tolerance for wildlife, often assessed using measures of wildlife acceptance capacity reflecting the maximum wildlife population level that is acceptable to people (Decker & Purdy, 1988; see also Bruskotter & Fulton, 2012; Bruskotter et al., 2015; Bruskotter & Wilson, 2014). Drawing on the cognitive hierarchy model (Fulton et al., 1996; see also Dietz et al., 1998) and attitude theory (Eagly & Chaiken, 1993), this paper addressed how human – wildlife interactions may be linked to public acceptance. Given that experiences are key for the formation of attitudes (Eagly & Chaiken, 1993), factors such as where people live and experience wildlife were hypothesized to contribute to the formation of public acceptance. Hence, external place dimensions, such as whether people live in an urban or a rural location, but also the specific place in which wildlife is experienced (e.g., in the forest or in a zoological park), will play a role in the psychological processing of information about wildlife (see Figure 1 for a conceptual model).

Place Dimensions and Place-based Experiences

External conditions, including different place dimensions reflecting biophysical and sociocultural characteristics, may contribute to the formation of wildlife acceptance. For example, although there is some heterogeneity within groups, people in rural settings are generally more critical of wildlife and display more favorable views of hunting than do people in urban settings (Eriksson et al., 2015; Gamborg & Jensen, 2017; Liordos et al., 2017; Sponarski et al., 2013). Such pattern can be explained by closer

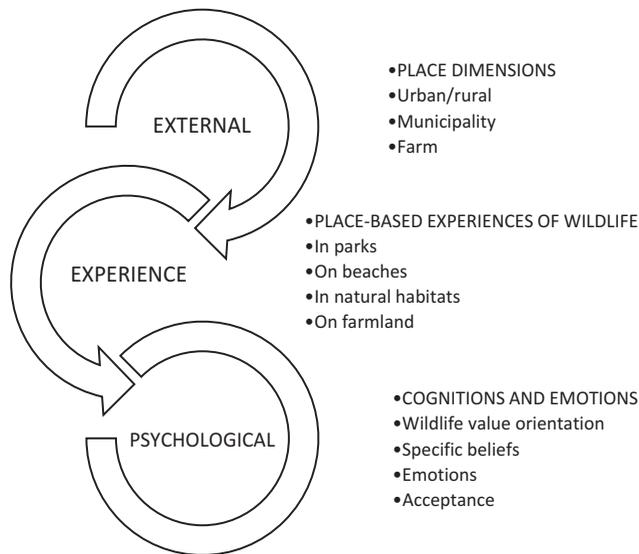


Figure 1. Connecting place dimensions to cognitions, emotions, and wildlife acceptance via place-based experiences.

proximity to wildlife, but also more experiences of wildlife and wildlife damage in rural areas (Dressel et al., 2015; Eriksson et al., 2015; Jonker et al., 2006). Moreover, rural residents have been found to display a lower level of social trust in agencies responsible for managing wildlife, and more positive views of wildlife use and lethal control compared to urban residents (Johansson et al., 2016; Manfredi & Zinn, 1996). Additional conditions of importance for perceptions of wildlife and management include the community context and occupation (e.g., farming; Goodale et al., 2015; Klich et al., 2018; Liordos et al., 2017). Hence, where people live and work constitute the physical, social, and cultural settings in which opinions about wildlife are formed and although evidence suggests that the influence is mainly indirect via other factors (e.g., experiences, wildlife value orientations, trust), these factors are critical for an appropriate understanding of public acceptance.

The motives for being in a place, the activity itself, and also place characteristics are important for how the experience is interpreted and processed (e.g., Clark & Stankey, 1979; Pasanen et al., 2018). Hence, the place in which wildlife is experienced (i.e., place-based experiences) constitutes an additional cue to understand public acceptance of wildlife (Massingham et al., 2019). For example, more experience with large carnivores has been associated with lower acceptance, whereas experiences with different wildlife on tours, at ecotourist sites, or via a web camera has been found to be positively related to attitudes and conservation behaviors (Apps et al., 2018; Eriksson et al., 2015; Jacobs & Harms, 2014; Skibins & Sharp, 2019). These results suggest that accidental versus organized and thus safe encounters have different implications for acceptance. Given that a wildlife encounter may be desired and expected in one place, but not in another, even experiences with the same wildlife may be different depending on where they occur.

Value Orientations, Beliefs, and Emotions

The cognitive hierarchy model depicts that cognitions can be ordered hierarchically, with general cognitions (e.g., values, value orientations) constituting the basis for more specific beliefs, attitudes, and behaviors (Fulton et al., 1996). Whereas the more general cognitions such as values and value orientations are considered relatively stable, few in number, and to transcend situations, specific cognitions are often numerous, more easily changed, and relate to a specific topic or context.

Value orientations constitute patterns of basic beliefs in relation to a specific domain and may be considered as expressions of more basic values (Fulton et al., 1996; Teel et al., 2010). In the domain of wildlife, two primary wildlife value orientations (WVOs) have been identified. The first is domination reflecting a utilitarian standpoint that humans are allowed to use wildlife for their own needs, and the second is mutualism emphasizing egalitarian ideas and considering different life forms, such as wildlife, to have rights. WVOs have been found to be significantly related to attitudes toward wildlife management (Hermann et al., 2013; Teel & Manfredi, 2009). In the Netherlands, for example, people with a stronger domination worldview, but a weaker mutualism worldview, have been found to display a higher acceptance of hunting geese (Sijtsma et al., 2012). Furthermore, specific beliefs (i.e., cognitions or thoughts about the attitude object such as geese), are important for other cognitions and attitudes (Fulton et al., 1996). For example, studies suggest that specific beliefs about a wildlife species may at least partly mediate the relationship between WVOs and risk perceptions (Sponarski et al., 2016). Personal and indirect experience with the attitude object, but also the more general value orientations, are considered the basis for specific beliefs (Eagly & Chaiken, 1993).

Although the cognitive hierarchy model depicts cognitions as the main basis of attitudes, attitude theory further acknowledges the importance of other psychological processes, such as affective processes including moods and emotions, for the formation of attitudes (Eagly & Chaiken, 1993). Emotions involve synchronized changes in the state of five subsystems including the cognitive, neurophysiological, motivational, motor expression, and subjective feeling components (Leventhal & Scherer, 1987; Scherer, 2001). The subjective experience of emotions has been assessed using either: (a) a discrete set (e.g., fear, anger, joy; Izard, 1991), or (b) core dimensions (e.g., valence, activation; Russell et al., 1989). In the wildlife context, emotions have been used as predictors of decision-making processes and acceptability of wildlife policy and management (Hudenko, 2012; Jacobs et al., 2014; Slagle et al., 2012). For example, disgust evoked by wolves has been found to be a predictor of acceptability of lethal control of wolves (Jacobs et al., 2014).

The Present Study

In this study, place dimensions, place-based experiences, WVOs, beliefs, emotions, and the acceptance of geese among the public in two municipalities in Sweden with significant goose populations were explored. Although geese may be more positively valued in some places such as natural areas, conflicts with human interests may be more apparent in places more heavily used by humans (e.g., beaches, parks, farmland) and geese may thus evoke more negative connotations in these places. Predictors of acceptance were identified

by drawing on the conceptual model outlined in [Figure 1](#). In accordance with the cognitive hierarchy model (Dietz et al., 1998), place dimensions and place-based experiences were mainly expected to have indirect impacts on the acceptance of geese, via beliefs and emotions, although direct effects cannot be ruled out. The following research questions were examined:

- (1) To what extent have the general public in these municipalities experienced geese in different places?
- (2) How does the general public in these municipalities perceive geese in terms of beliefs about ecosystem services (e.g., beautiful to watch, contribute to higher biodiversity) and disservices (e.g., crop damage, angry geese on beaches), positive and negative emotions evoked by geese, and acceptance of geese?
- (3) What are the predictors of acceptance of geese among the general public in these municipalities?

Methods

Study Context

The two Swedish municipalities were Kristianstad (56°N, 14°E) in the province of Skåne in southern Sweden, and Örebro (59°N, 15°E) in the province of Närke 370 km farther north. Three criteria guided the selection of these municipalities. First, both have significant numbers of breeding and staging geese (Nilsson, 2013; Ottosson et al., 2012), as it was important that the public was likely to have experience with wild geese. Second, our selection included one municipality with a relatively more rural population and one with a more urban population. Whereas Kristianstad is less populous (84,151 residents in 2017) and has more farmland, Örebro has a larger population (150,291 in 2017) and less farmland (Statistics Sweden [SCB], 2019; Swedish Association of Local Authorities and Regions, 2017). Moreover, the population in Örebro has a slightly higher educational level than that in Kristianstad (SCB, 2019). Third, two municipalities with different cultures with geese were selected. Kristianstad in Skåne harbors a strong tradition of consuming geese around Saint Martin's eve on November 10 (where roast goose is the main course), whereas this custom is not traditional in the Örebro area.

Sample

A questionnaire was mailed to a randomly selected sample of residents 20–75 years of age. The final sample consisted of 2,973 residents and after two reminders, the response rate was 30% (Kristianstad, $n = 434$, Örebro, $n = 464$). A commercial survey company (Kvalitetsindikator AB) conducted the study in the autumn of 2018. The gender distribution was even in the two samples (Women: Kristianstad: 52%, Örebro: 51%). Furthermore, the differences between the two municipalities were in line with expectations (SCB, 2019), with a higher mean age in Kristianstad ($M = 54.8$ years, $SD = 14.7$) than in Örebro ($M = 51.3$ years, $SD = 16.2$) ($p = .001$) and a larger share of rural residents (living in areas with fewer than 10,000 residents) in Kristianstad (53%) than in Örebro (16%) ($p = .001$).

Whereas both samples displayed an overrepresentation of respondents with a high educational level, the share with a university degree was, as expected, slightly lower in Kristianstad (45%) than in Örebro (54%) ($p = .013$). Despite the more rural sample in Kristianstad, there was no significant difference in the share of respondents living in a farming household (9% in Kristianstad and 6% in Örebro). The representativeness of the samples is further considered in the discussion section.

Measures

The questionnaire contained *questions about the participant*, that is, gender, age, education level, the size of the population where the respondent lived (6 categories, ranging from altogether rural to more than 100,000 residents), and whether they lived in a farming household.

Place-based experience related to geese was measured in four different settings using single item measures: “To what extent do you have personal experiences of geese in the following places: in parks, on beaches, in natural areas outside urban areas, on farmland?” Answers were provided on a five-point scale from “not at all” to “to a great extent.”

WVOs were assessed using a Swedish translation of a short scale version of mutualism and domination (Miller et al., 2018). However, whereas mutualism was assessed by means of four items, only three of the original four items were used for measuring domination (the item “Wildlife is on earth primarily for people’s benefit” was not included). A five-point response scale ranging from “totally disagree” to “totally agree” was used. A factor analysis with varimax rotation confirmed two factors explaining 61% of the variance (eigenvalues: 2.477, 1.773) with satisfactory internal reliability (Mutualism: $\alpha = .78$, Domination: $\alpha = .67$). Although the mean value on the mutualism scale was slightly higher in the public in Kristianstad than in Örebro ($M = 3.43$, $SD = 0.98$ and $M = 3.27$, $SD = 0.95$, $p = .018$), the mean values on the domination scale did not differ between the municipalities ($M = 2.28$, $SD = 0.95$ and $M = 2.25$, $SD = 0.88$, $p = .610$).

Specific beliefs about geese covered six ecosystem services and six disservices that geese may provide (e.g., Fox et al., 2017). Respondents were asked the question: “To what extent do you believe the following to be a benefit [causes problems] for humans or the ecosystem in Sweden?” Answers were provided on a five-point scale from “not at all” to “to a great extent,” including the possibility to answer “don’t know” because not everyone in the public may be able to assess the range of services asked. See Table 1 for the list of services. When using parametric statistics, the “don’t know” answers were removed. An exploratory factor analysis with varimax rotation resulted in three factors with eigenvalues of more than 1 (4.501, 2.230, 1.465), explaining 68% of the variance. The factors were labeled: Ecosystem Disservices (EDS) (6 items, $\alpha = .87$), Ecosystem Service nature (ES nature) (4 items, $\alpha = .85$) and food/hunting (ES food/hunting) (2 items, $\alpha = .66$). The scales displayed acceptable internal reliability.

Emotions evoked by geese were assessed by means of the question: “To what extent do geese evoke the following emotions in you?” including seven negative (sadness, despair, worry, disgust, anger, fear, irritation) and five positive (relief, enthusiasm, pleasure, interest, joy) emotions. Answers were provided on a seven-point scale (0–6, “not at all” to “very strong”) (Skogen et al., 2018). An exploratory factor analysis with varimax

rotation revealed two factors with eigenvalues of more than 1 (4.482, 3.749) explaining 69% of the variance. The factors included positive and negative emotions respectively, and the internal reliabilities were high ($\alpha = .91$, $\alpha = .89$, respectively).

Acceptance of geese was assessed using an attitude measure and a measure of wildlife acceptance capacity. The attitude toward geese was assessed by means of two items: (a) “What do you think about having geese present in Sweden?” using a five-point dislike to like response scale, and (b) “What is your attitude toward geese?” using a five-point negative to positive response scale (e.g., Dressel et al., 2015; Eriksson et al., 2015). The composite measures displayed good reliability ($\alpha = .91$). Previous research of wildlife acceptance capacity has included measures reflecting whether people would prefer the wildlife population to decrease or increase and the potential for coexistence (Bruskotter et al., 2015; Skupien et al., 2016). In the present study, two questions relevant in the goose context were included: (a) “What is your perception of the goose population in your municipality?” using a five-point response scale (far too few, too few, just right, too many, far too many) and (b) “What is your perception of whether the number of geese have changed the last 10 years in your municipality?” using a five-point response scale (diminished a lot, diminished a little, no change, increased a little, increased a lot). The scales were reversed so that a higher value reflected a higher acceptance capacity. The composite measure displayed good internal reliability ($\alpha = .76$).

Analyses

Analyses were conducted using SPSS 24. To address the first research question, public experiences with geese in Kristianstad and Örebro were analyzed using independent samples *t*-tests and point-biserial correlations (r_{pb}) to assess effect sizes. According to Cohen (1988), a small, medium, and large effect size are equivalent to $r_{pb} = .10$, $r_{pb} = .24$, and $r_{pb} = .37$, respectively, although caution is advised when using rules of thumbs for determining how large an effect size is. Comparable analyses were conducted using the individual measures of beliefs, emotions, and acceptance as dependent variables, respectively, to answer the second research question. In addition, the individual measures of attitude and acceptance capacity were described by means of frequencies. Before examining predictors of acceptance as stipulated by the third research question, the association between the two composite measures of acceptance was assessed using Pearson correlations (r). Subsequently, two hierarchical regression analyses of acceptance of geese were conducted while controlling for socio-demographic variables. The following variables were included in the analyses: (a) socio-demographic variables (gender: female = 1, age: continuous, education: university degree = 1), (b) place dimensions (municipality: Örebro = 1, place population: urban (more than 10,000 residents) = 1, farming household: yes = 1), (c) place-based experiences (in parks, on beaches, in natural areas outside urban areas, on farmland), (d) WVOs (mutualism, domination), (e) beliefs (ES nature, ES food/hunting, EDS), and (f) emotions (positive, negative) as predictors of attitude and acceptance capacity, respectively. The regression analyses were conducted in a reduced sample size because “don’t know” answers to the belief measures had to be removed ($n = 529$ and $n = 527$, respectively). Multicollinearity among the independent variables were tested with the variance inflation factor (VIF).

Results

Place-based Experiences, Beliefs, Emotions, and Acceptance of Geese

Descriptive statistics for place-based experiences, beliefs, emotions, and acceptance in the public in Kristianstad and Örebro are displayed in Table 1. The public in Örebro had experienced geese to a greater extent in parks, on beaches, and in natural areas compared to the public in Kristianstad, but the reverse was found for farmland. The public in Kristianstad believed geese provided ecosystem services to a greater extent and ecosystem disservices to a lesser extent than did the public in Örebro. However, the public in Kristianstad believed that geese contributed to agriculture damage (a disservice) more than did the public in Örebro. Except for the belief that geese are beautiful to watch, the level of “don’t know” answers to belief questions was high. Moreover, a larger share in Örebro (approximately 50%) compared to Kristianstad (between 20–30%) answered that they did not know whether the hunting of geese is appreciated and whether geese are considered good food. In contrast, a larger share in Kristianstad compared to in Örebro did not have an opinion about angry geese on beaches and geese droppings in parks. Geese did not evoke strong emotions among the sample, but the positive emotions were stronger than

Table 1. Means (*M*) and standard deviations (*SD*) for place-based experiences, beliefs about geese in terms of ecosystem services and disservices, emotions evoked by geese, and acceptance of geese.

	Kristianstad M (SD)	Örebro M (SD)	Point-biserial correlation	Kristianstad Don't know (%)	Örebro Don't know (%)
Place-based experiences ^a					
In parks	2.86 (1.40)	3.69 (1.24)***	.30***	na	na
On beaches	2.06 (1.26)	3.14 (1.42)***	.37***	na	na
In natural areas	3.05 (1.36)	3.34 (1.34)**	.10**	na	na
On farmland	3.19 (1.54)	2.46 (1.49)***	-.23***	na	na
Ecosystem services ^a					
Beautiful to watch	3.71 (1.01)	3.40 (1.08)***	-.15***	4	2
Contribute to increased nature tourism	3.01 (1.22)	2.67 (1.22)***	-.14***	26	29
Contribute to higher biodiversity	3.36 (1.07)	3.17 (1.06)	-.09	46	47
Important part of the ecosystem	3.53 (1.15)	3.44 (1.16)	-.04	25	27
Goose hunting is appreciated	3.36 (1.29)	2.79 (1.30)***	-.21***	34	50
Good food	3.49 (1.32)	2.58 (1.36)***	-.32***	21	52
Ecosystem disservices ^a					
Crop damage	3.95 (1.15)	3.72 (1.07)*	-.10*	30	53
Angry geese on beaches	2.26 (1.14)	3.32 (1.28)***	.39***	21	9
Risk for collisions at airports	3.36 (1.20)	3.35 (1.18)	.00	33	40
Disease transmission	2.60 (1.26)	2.72 (1.20)	.05	43	48
Droppings in parks, on beaches and golf courses	3.21 (1.34)	4.08 (1.08)***	.34***	20	6
Over fertilization of water courses	3.08 (1.30)	3.43 (1.20)**	.14**	42	46
Emotions ^b					
Positive emotions	1.83 (1.62)	1.49 (1.40)***	-.11***	na	na
Negative emotions	0.61 (1.03)	0.92 (1.19)***	.14***	na	na
Acceptance					
Attitude ^c	3.78 (0.77)	3.54 (0.87)***	-.14***	na	na
Acceptance capacity ^d	2.44 (0.80)	2.43 (0.80)	-.01	na	na

^aFive-point scale (1 = not at all, 5 = to a great extent).

^bSeven-point scale (0 = not at all, 6 = very strong).

^cFive-point response scale where a higher value represents a more positive attitude.

^dFive-point response scale where a higher value represents a higher acceptance capacity.

na = not applicable.

p* < .05; *p* < .01; ****p* < .001

the negative emotions. In addition, geese evoked stronger positive emotions among the public in Kristianstad and stronger negative emotions among the public in Örebro.

Overall, results revealed a favorable view of the occurrence of geese in these municipalities, although a significant share believed that the number of geese was too high. Whereas the public in Kristianstad was more positive toward geese than was the public in Örebro, there was no significant difference in acceptance capacity. A large majority of respondents, 71% in Kristianstad and 60% in Örebro, liked to have geese in Sweden and approximately half of the respondents displayed a favorable view of geese more generally (60% in Kristianstad and 48% in Örebro). Whereas half of the respondents (51%) in both municipalities believed that the number of geese had increased during the last 10 years, 42% in Kristianstad and 37% in Örebro had not noted any change. Nevertheless, 36% of the public in Kristianstad and 48% of the public in Örebro thought the number of geese was too high.

Predictors of Acceptance of Geese

The correlation between the two acceptance measures was significant, but not particularly strong ($r = .365$, $p = .001$). The hierarchical regression analysis of attitude toward geese is displayed in [Table 2](#). Because no VIF value exceeded 2.007, there was no evidence of multicollinearity in the model. Results showed that the socio-demographic variables did not significantly contribute to explaining attitude. Municipality and place population were significant predictors, with the public in Kristianstad and people living in urban places displaying a more positive attitude. After considering place-based experience and the cognitions and emotions, however, only place population remained significant. More experience with geese on beaches was associated with a negative attitude toward geese, whereas more experience in natural areas was associated with a positive attitude. Given that place-based experience was no longer significant in the last step of the analyses, the relationship with attitude can be considered indirect via cognitions and emotions. Furthermore, stronger mutualism values and weaker domination values were associated with a positive attitude toward geese. Beliefs in ES and positive emotions were linked to a more positive attitude and beliefs in EDS, and negative emotions were linked to a more negative attitude. Overall, place dimensions and place-based experiences were significant, but they explained only a small share of the variance in attitude. The WVOs, and in particular, specific beliefs and emotions, increased the level of explained variance considerably.

The model of acceptance capacity did not show signs of multicollinearity among the independent variables, with VIF values of 2.009 or lower. Socio-demographic variables and place dimensions were important for acceptance capacity ([Table 3](#)). Age was a significant predictor of acceptance capacity in all steps of the analysis, suggesting that older people displayed a lower acceptance capacity of geese. Similarly, living in a farming household was associated with a lower acceptance capacity, even after considering place-based experiences, cognitions, and emotions. More experience of geese on beaches was associated with a lower acceptance capacity. Whereas this effect decreased after the inclusion of cognitions and emotions, the significant negative association between experience of geese on farmland and acceptance capacity remained also in the final step of the analysis. Furthermore, mutualism and domination were related to acceptance capacity, although the effect of the WVOs did not remain significant after considering the more

Table 2. Hierarchical regression analyses examining predictors of attitude toward geese in five steps: (a) sociodemographic variables, (b) place dimensions, (c) place-based experiences, (d) wildlife value orientations, and (e) beliefs and emotions.

	Socio-demographics	Place dimensions	Place-based experience	Wildlife value orientations	Beliefs and emotions
	β	β	β	β	β
Step I					
Gender	.07	.06	.06	-.02	.06*
Age	-.01	-.01	.00	-.03	-.01
Education	.01	.01	-.01	.01	.00
Step II					
Municipality		-.15***	-.13*	-.10*	.00
Place population		.11*	.09	.11*	.08**
Farming household		-.05	-.05	-.02	.01
Step III					
In parks			.10	.08	.02
On beaches			-.17***	-.12**	.01
In natural areas			.20***	.08	-.03
On farmland			-.02	.05	.05
Step IV					
Mutualism				.37***	.06*
Domination				-.22***	-.06*
Step V					
ES Nature					.24***
ES Food/hunting					.06*
EDS					-.08*
Positive emotions					.36***
Negative emotions					-.38***
Adj R2	.00	.02**	.07***	.26***	.67***
Δ R2	-	.02**	.05***	.19***	.41***

$n = 529$. Dummy variables: gender (women = 1), education (university degree = 1), municipality (Örebro = 1), place population (urban = 1), farming household (yes = 1).

* $p < .05$; ** $p < .01$; *** $p < .001$.

specific beliefs and emotions. Whereas beliefs in ES nature and positive emotions were associated with a higher acceptance capacity, beliefs in ES food/hunting and EDS as well as negative emotions were associated with a lower acceptance capacity. Hence, socio-demographics, place dimensions, and place-based experiences were relevant for acceptance capacity. Even though the WVO increased the explained variance in acceptance capacity, the largest share of explained variance could be attributed to the specific beliefs and emotions.

Discussion

Following the gradual recovery of goose populations, management of geese in Europe has changed from mainly being dedicated to conservation to also focusing on resolving conflicts between different interests (Fox & Madsen, 2017). With the increase and spread of geese, an understanding of the experiences and opinions of different involved stakeholder groups, but also the general public, can provide insights important for goose management that is widely accepted and sustainable long-term. This study showed a high level of explained variance in acceptance and confirmed the interplay between

Table 3. Hierarchical regression analyses examining predictors of acceptance capacity of geese in five steps: (a) sociodemographic variables, (b) place dimensions, (c) place-based experience, (d) wildlife value orientations, and (e) beliefs and emotions.

	Socio-demographics	Place dimensions	Place-based experience	Wildlife value orientations	Beliefs and emotions
	β	β	β	β	β
Step I					
Gender	.04	.02	.04	-.01	.00
Age	-.26***	-.25***	-.23***	-.23***	-.16***
Education	-.03	-.03	-.02	-.01	-.02
Step II					
Municipality		-.08	-.04	-.02	.00
Place population		.06	.03	.03	.02
Farming household		-.16***	-.14***	-.11**	-.08*
Step III					
In parks			-.02	-.03	-.06
On beaches			-.20***	-.18***	-.08
In natural areas			.06	.00	-.06
On farmland			-.25***	-.21***	-.17**
Step IV					
Mutualism				.16***	-.07
Domination				-.18***	-.06
Step V					
ES Nature					.27***
ES Food/hunting					-.17***
EDS					-.19***
Positive emotions					.10*
Negative emotions					-.15***
Adj R2	.06***	.09***	.18***	.24***	.45***
Δ R2	-	.03***	.09***	.06***	.21***

N = 527. Dummy variables: gender (women = 1), education (university degree = 1), municipality (Örebro = 1), place population (urban = 1), farming household (yes = 1).

* $p < .05$; ** $p < .01$; *** $p < .001$.

external conditions, wildlife experiences, and psychological processes for public acceptance of geese.

The effects of socio-demographics and place dimensions on attitude and acceptance capacity indicate that where and how people live their lives matter for the acceptance of geese. Differences between the municipalities may illustrate this. The public in Örebro reported more experience with geese (except on farmland), believed geese provide fewer ecosystem services and more disservices, and stated that geese evoke more negative and less positive emotions than did the public in Kristianstad. The goose tradition in Skåne where Kristianstad is located may be important for understanding the more favorable view of geese among the public in this area. In addition, differences in the ability to assess ecosystem services (as indicated by the share of “don’t know” responses), suggest that the public in Kristianstad was more familiar with hunting and consuming geese, but slightly less familiar with problems associated with geese at areas such as beaches. Given that geese have been numerous in Skåne for a longer period of time, the public in Kristianstad may be more used to large populations of geese, and they seem to place less emphasis on disservices than does the public in Örebro. Previous research has shown that living close to wildlife may be associated with a high level of acceptance

(Klich et al., 2018), although growing populations of wildlife have also been found to be associated with reduced acceptance (Eriksson et al., 2015).

This study takes an additional step toward understanding how the place for wildlife encounters matters for public acceptance. Whereas previous studies have found that the association between wildlife experience and acceptance vary across contexts, potentially reflecting accidental *versus* organized encounters (Apps et al., 2018; Eriksson et al., 2015), this study compared experiences in different places and confirmed that where geese have been encountered is important for acceptance. Although there were some differences between the acceptance measures, results indicated that more experience with geese in some places more heavily used for human activities (beaches and farmland) were associated with a lower acceptance of geese and the opposite was found for other places (natural areas). Whether wildlife encounters are positively or negatively valued may depend on the situational circumstances and each individual's appraisals of the event (e.g., perceived danger, unpredictability, controllability; Johansson et al., 2012). Considering that problems associated with geese (e.g., droppings) may be more of a nuisance on beaches and lawns than in a natural area when watching geese at a distance, the activity and how particular wildlife encounters fit with people's expectations are likely important for the public's appraisals of geese. This reasoning is in line with recreational research where emotions experienced during a visit to nature have been found to be dependent on people's motives for being there (e.g., Pasanen et al., 2018). In addition, since the importance of place-based experiences for acceptance was lower after accounting for cognitions and emotions, results are in line with the notion that general wildlife experiences may feed into the formation of specific beliefs and emotions about geese (e.g., Dietz et al., 1998).

WVOs, specific beliefs, and emotions were found to be most strongly related to the acceptance of geese. Relationships were generally in the expected direction with, for example, stronger mutualism values, weaker domination values, and more positive emotions associated with higher acceptance. However, as suggested by Buij et al. (2017), the evaluation of ES and EDS is to some extent subjective. Results revealed that beliefs about ES did not form a coherent measure, but could be divided into nature *versus* food/hunting. In addition, only beliefs reflecting nature ES were associated with both acceptance measures. The beliefs that geese taste good and constitute a hunting opportunity were, in contrast, negatively associated with acceptance capacity, supporting a distinction between use and protection evident in most research of people's perceptions of nature (e.g., Bengston, 1994; Bogner & Wiseman, 1999).

The association between the two acceptance measures was weaker than in previous research (e.g., Bruskotter et al., 2015) and slightly different variables were confirmed predictors. For example, whereas emotions were more important predictors of attitudes, beliefs about ES food/hunting and EDS displayed stronger associations with acceptance capacity. Results thus support a distinction between the different measures of acceptance and confirm the complementary role of these measures. Attitude measures are theoretically derived and by using standardized measures, results may be more easily compared across studies. In contrast, measures of acceptance capacity are often more closely adapted to the study context, but even though it has been criticized for lack of clear conceptualization and measurement (Bruskotter & Fulton, 2012), it provides insights for management.

Given that farmers' livelihood may be directly affected by geese (Fox et al., 2017), it was not surprising that members of farming households displayed a lower acceptance capacity, as did respondents with more experience with geese on farmland. However, comparable results were not found for attitude toward geese. Hence, the size of populations, and not the right of geese to exist, seems to be the main concern among farmers, contrary to studies of large carnivores where some groups have been found to dispute the rights of some species (e.g., wolves) to exist (Eriksson et al., 2015). The distinction between damaging versus threatening species (Goodale et al., 2015) may play a role for these differences in perceptions.

When interpreting these results, it is important to consider some limitations. The use of random sampling permitted representative samples, although the attrition may make the sample deviate from the population. Respondents with a higher educational level were overrepresented in this study, but since education was not a significant predictor of the acceptance of geese, it can be assumed to be of minor importance for the conclusions. For this study, it may be more important that differences between the samples in the two municipalities were in line with expectations. Although the high level of "don't know" answers to the questions about ecosystem services and disservices may lead to reduced power in the regression analyses, results were generally in line with expectations. Furthermore, this study revealed that more experience with geese on, for example, beaches is negatively associated with acceptance. Given that this was a cross-sectional study, however, results cannot confirm that more experience with geese on beaches will lead to a lower future acceptance of geese.

To conclude, this study revealed that the public in two municipalities in Sweden with significant goose populations generally displayed favorable views toward geese, although an increase in goose numbers and problems associated with them were also observed. The study confirmed that more experience with geese in some places frequently used by people (e.g., beaches) is associated with a lower acceptance of the species. Hence, unless negative interactions with geese are minimized, the increase and spread of geese may lead to a lower public acceptance of these birds in the future. Although this study suggests that specific goose management actions may be appropriate to mitigate conflicts, especially in some places and for specific situations, additional studies are needed to determine whether strategies such as lethal control, scaring, or habitat management (Fox et al., 2017) are accepted by the public. By highlighting the public's concerns, this study – together with studies of different stakeholder groups, such as farmers, hunters, and ornithologists – guide the development of legitimate goose management. Opening up a dialogue with the public is important to increase the understanding of the ecology and management of geese in times of anthropogenic environmental change.

Acknowledgments

We are very grateful for the comments on an earlier draft from two anonymous reviewers and the associate editor.

Funding

This work was supported by the Umeå Universitet.

ORCID

Louise Eriksson  <http://orcid.org/0000-0002-6673-0079>

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