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Tolerance, preferred sighting frequency and support for hunting of black bears (*Ursus americanus*)

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Summary

Residents' attitudes towards wildlife and their management can be crucial in population control. Using a novel approach, we examined East Tennessee residents' tolerance for American black bears and attitudes towards hunting. Most residents viewed black bears positively, tolerated their presence and preferred seeing them in their area. Attitudes were influenced by concern about future encounters, the values and benefits attributed to bears, prior experiences and perceptions of human–bear conflict and conflict frequency, whereas sociodemographic factors were less influential. Support for regulated hunting was influenced by sociodemographic factors more so than cognitive factors. Our findings suggest opportunities for managers to increase tolerance of black bears among residents through outreach emphasizing the benefits of living with the bears and guidance for avoiding negative encounters. Greater trust in the wildlife agency may result from such outreach, potentially leading to greater levels of tolerance among residents of bear-inhabited areas.

Introduction

Tolerance of wildlife populations and negative effects associated with their presence have been described and modelled using various empirical frameworks, generally with a primary objective of determining whether individuals desire a species' populations to increase, decrease or remain approximately the same (Lischka et al. 2008, 2019, Bruskotter & Fulton 2012, Zajac et al. 2012, Siemer et al. 2023). Support for lethal control has been shown to increase once a species' numbers reach levels considered to be beyond acceptable (Loker et al. 1999), so insight into local tolerance of a species can inform policy by assisting managers in estimating the threshold at which individuals or communities might begin supporting or taking actions to adversely impact its numbers (Bruskotter & Fulton 2012, Hogberg et al. 2016, Margules et al. 2020).

After experiencing declines beginning after European settlement, bear populations in most parts of the USA are making a comeback. The state of Tennessee alone has an estimated population of 5000–6000 black bears, and this continues to grow (TWRA 2023). Although the public generally maintains positive attitudes towards black bears (Siemer & Decker 2003, Kretser et al. 2009), decisions regarding their management can elicit strong reactions from interest groups (Johnson & Sciascia 2013). Moreover, public attitudes and preferences towards black bear management vary significantly across different geographical locations (Zajac 2010, Cleary et al. 2021). Since disparate views on appropriate management strategies can lead to scrutiny of and diminished confidence in wildlife agencies, as well as actions that could harm a species (Lackey et al. 2018), how managers understand, interact with and influence residents of bear-inhabited areas are critical (Lackey et al. 2018, Montana et al. 2020). As bears continue to recolonize their former range, understanding local residents' management preferences and the factors that engender or inhibit tolerance within communities can inform the design and implementation of regulations, education and targeted outreach to help ensure the long-term viability of the state's black bear populations.

The specific objectives of this study were to understand Tennessee residents' attitudes towards black bears, their perceived risk of living with them and their preferences for population management. Additionally, the study aimed to identify the psychosocial and sociodemographic factors influencing residents' tolerance of black bears and support for regulated hunting in their area.

Researchers have utilized various social-psychology frameworks to understand and explain human attitudes towards large predators globally (Kansky & Knight 2014). Previous empirical research provides a basis for expectations about personal experiences, perceptions, wildlife value orientations and traits likely to be associated with tolerance of the presence of black bears and preferences for their management (e.g., Riley & Decker 2000, Lischka et al. 2008, Zajac et al. 2012, Cleary et al. 2021). Because individuals' tolerance of wildlife populations may be determined by subjective perceptions of abundance rather than actual population levels,

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tolerance was quantified in our model using two variables: preferred and current levels of bear sightings. Population preferences and the acceptability of management actions for large predators are often context (e.g., encounter frequency and intensity) dependent. To capture the variation in outcomes associated with different types of common bear–human interactions and their influence on the dependent variables of interest, our models of tolerance, preferred sightings and acceptance of regulated hunting of black bears include variables representing the frequency with which respondents reported encountering bears as well as their perceptions (aggressive or not) regarding their experiences with bears. Individuals' value orientations have been shown to be reliable predictors of attitudes towards black bears and of the acceptability of actions related to their management (e.g., Lischka et al. 2019). Accordingly, our models include a composite variable representing individuals' evaluations of specific benefits and drawbacks commonly associated with the presence of bears. Lastly, following similar research examining tolerance and management preferences for black bears (e.g., Lischka et al. 2019, Cleary et al. 2021), our explanatory models also include variables capturing the influences of social trust and sociodemographic characteristics on the dependent variables of interest.

We employ a novel approach to measuring tolerance and analysing it along with traditional measures of tolerance and approaches to linking it with the context of support for regulated hunting. Unlike the traditional practice of simply asking residents regarding the level of bear population (more, less, etc.) they desire (e.g., Zajac et al. 2012, Lischka et al. 2019, Siemer et al. 2023), we adjusted residents' population preferences by their perceptions of the current population level. Our approach explicitly accounts for residents' perceptions regarding the existing level of the bear population while quantifying tolerance, which allowed us to accurately characterize tolerance among residents facing different levels of bear abundance. Moreover, we analysed the varying effects of aggressive and non-aggressive encounters with bears and the perceptions of bear behaviour (i.e., whether they perceive bear behaviour to be a conflict) on resident tolerance of black bears.

Methods

Survey data collection

Data for this study were collected in April 2023 via a mail survey of residents in 30 East Tennessee counties where black bears occur. Education and outreach programmes (e.g., Bearwise.org) are being promoted to help residents live responsibly and coexist with the bears in the state of Tennessee. The questionnaire was developed in consultation with a human dimensions specialist and bear biologists at the Tennessee Wildlife Resources Agency (TWRA) and was initiated and administered following the modified Tailored Design Method (Dillman et al. 2009). At survey completion, 1497 of the 7497 contacted residents had responded. After adjusting for 25 ineligible questionnaires (e.g., deceased, wrong address, returned blank), the response rate was 20%, which is consistent with past mail surveys using randomized residents as the sampling frame (e.g., Dalrymple et al. 2012, Poudyal et al. 2016, Watkins et al. 2021). We weighted the sample of survey responses so that the gender of the survey sample mirrored the population of residents in the area.

Measurement of variables and analysis

Rather than eliciting respondents' tolerance by simply asking their population preference (e.g., Zajac et al. 2012, Lischka et al. 2019,

Siemer et al. 2023), we created a variable representing tolerance (TOLERANCE) by subtracting the current level of sightings (SIGHTINGS) reported by respondents from their preferred level of sightings, both rated on the same five-point Likert scale (1 = never, 5 = always). Residents' perceptions regarding the frequency of bear-related conflicts (CONFLICT) were elicited with the following question: 'How frequent are bear-related conflicts in the area where you currently live?' Responses were rated on a five-point Likert scale of frequency (1 = never, 5 = always).

Whether residents had experienced seven described situations involving bears and whether they considered those situations to be conflicts were elicited with the questions 'Have you had the following experiences with bears in the last 5 years?' and 'Which of the following do you consider a conflict with a bear?', respectively. The seven situations included 'presence on or near my property with no damage', 'damage to my property (e.g., vehicle, equipment)', 'damage to my crops/garden', 'attack on humans', 'eating from trash cans', 'eating from bird feeders' and 'attack on livestock (e.g., cattle, chickens)'; responses to both questions were coded 1 = yes, 0 = no. A variable representing the extent to which individual residents had experienced the described situations (EXPERIENCE) was calculated as the mean of the seven responses. A variable representing the extent to which respondents considered the encounters that involved aggressive behaviour (i.e., damage to my property, damage to my crops/garden, attack on humans and attack on livestock) to represent a conflict (AGGRESSIVE ENCOUNTER) was calculated as the mean of the responses to the four situations involving aggressive behaviour. A variable representing the extent to which the three described encounters that did not involve aggressive behaviour (i.e., presence on or near my property with no damage, eating from trash cans and eating from bird feeders) were considered by the respondent to represent a conflict (NON-AGGRESSIVE ENCOUNTER) was calculated as the mean of the responses to the three situations not involving aggressive behaviour. With a five-point Likert scale (1 = not at all concerned, 5 = extremely concerned) response to the question 'How concerned are you about the following possibly happening to you within the next 2 years?', the variable (CONCERN) representing residents' level of concern that the seven described situations could possibly happen to them in the next 2 years was calculated.

A variable representing agency trust (TRUST) was calculated as the mean of the responses on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to the following four statements: 'TWRA has taken appropriate actions to manage the bear population in my area', 'TWRA has taken satisfactory efforts to control bear–human conflict', 'TWRA has made a reasonable effort to educate the public about bears' and 'I am confident in TWRA's ability to effectively manage the bear conflict'. A variable representing residents' values with respect to black bears (VALUES) was calculated as the mean of the responses on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to the following five statements: 'bears are important for the ecosystem', 'I enjoy knowing that black bears exist (even if I never see one)', 'bears can positively contribute to the outdoor economy', 'bears and humans can coexist' and 'bears are a burden I'd rather not deal with', the latter of which being reverse coded.

Respondent gender (GENDER), educational level attained (EDUCATION), annual household income (INCOME) and years residing in Tennessee (TENNESSEE) were elicited, as was whether respondents had hunted for either bear, deer, turkey, game or birds in the previous 5 years (HUNTER). Whether residents supported an open hunting season for bears (SUPPORT HUNTING) was

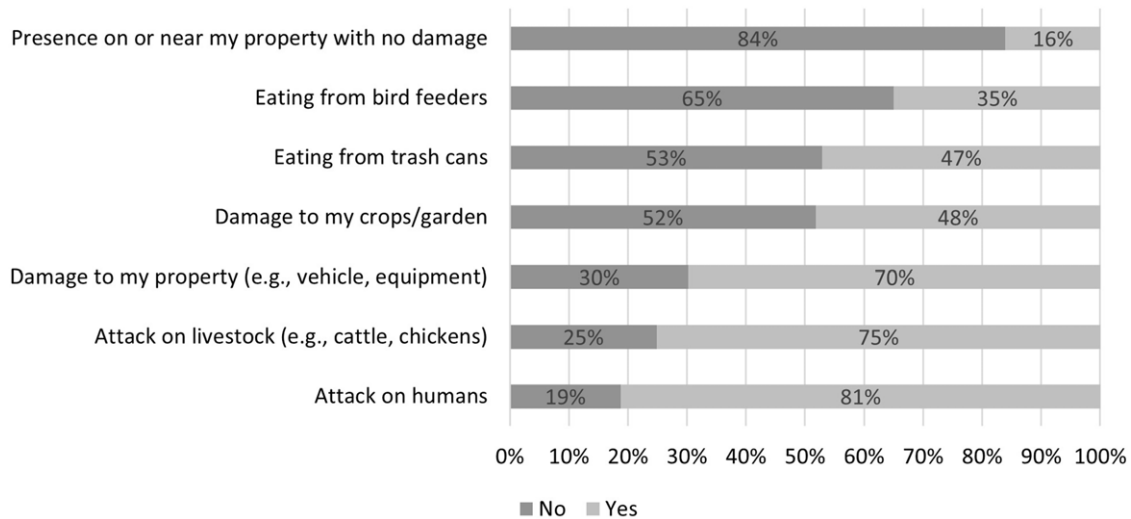


Figure 1. Percentages of respondents that considered the described situation to be an impact from or conflict with bears.

elicited with the following question: ‘Do you support regulated hunting for bear management in area where you live?’

Three separate regression models were estimated using TOLERANCE, SIGHTINGS and SUPPORT HUNTING as dependent variables. The models including TOLERANCE and SIGHTINGS as the dependent variable were estimated in *Stata 16* using ordered logistic regression; the model examining support for hunting was estimated using binomial logistic regression (StataCorp 2019).

Results

Fifty-one per cent of the survey respondents were female. Thirty-four per cent had completed some college education, 24% had completed high school, 22% had a bachelor’s degree (22%) and 17% had a graduate degree. One-third (34%) of respondents reported an annual household income of USD 50 000 or less, 39% reported USD 50 000–100 000, 16% reported USD 100 001–150 000 and 12% reported over USD 150 000. Twenty-two per cent of respondents self-identified as a hunter. These characteristics, especially in terms of gender, education and hunter status, are generally in line with the population of Tennessee as shown by recent census data.

Perceived and preferred levels of bear sightings

One-fifth (19%) of respondents indicated bears are ‘never’ seen in the area where they live, while a greater proportion indicated bears are either ‘rarely’ (38%) or ‘sometimes’ (33%) seen. Only 9% and 1%, respectively, indicated bears are ‘very often’ or ‘always’ seen where they live. Twenty per cent of respondents indicated that they prefer to never see bears in the area where they live, while just under three-quarters indicated their preference was to see bears either rarely (34%) or sometimes (38%). Less than 10% of respondents indicated their preference was to see bears either very often (6%) or always (2%).

A cross-tabulation of current and preferred levels of bear sightings showed that 42% of those who had never seen a bear in their area wanted never to see them, whereas 36%, 19%, 2% and 1%, respectively, preferred to see them rarely, sometimes, very often or always. Among those who currently always saw bears in

their area, 7%, 20%, 33%, 13% and 27% preferred to see them never, rarely, sometimes, very often or always, respectively. The highest proportion (62%) of respondents whose sighting preference corresponded with the current population level was among those who reported seeing bears only sometimes.

Perceptions of conflict and current conflict level

Most respondents considered an attack on humans (81%), livestock (75%) and damage to their property caused by a bear (70%) to be situations of conflict with bears. Just under half of respondents considered damage to their crops (48%) or eating from trash cans (47%) to be conflicts (Fig. 1). Thirty-five per cent of respondents considered a bear eating from bird feeders to be an conflict, while 16% considered the presence of a bear on or near their property to be an conflict. Whether respondents had experienced the described situation involving bears was a significant predictor ($p < 0.05$) of whether they considered the situation to be a conflict for all of the seven situations except for experiencing a personal attack by a bear. Thirty-six per cent of respondents indicated bear-related conflicts ‘never’ occur where they live, 48% indicated bear-related conflicts ‘rarely’ occur, 12% indicated bear-related conflicts ‘sometimes’ occur, 3% indicated bear-related conflicts ‘very often’ occur and less than 1% indicated bear-related conflicts ‘always’ occur in the area where they live.

Concern about encounters and prior experience with bears

Seventy-eight per cent of respondents indicated they were either not at all concerned or were slightly concerned that they could experience a personal attack by a bear in the next 2 years (Fig. 2); a greater proportion indicated that they were either not at all concerned or slightly concerned about an attack on their livestock (80%), about bears eating from their trash cans (81%) or bird feeders (83%), about damage to their property (84%) or crops/garden (86%) and about the presence of a bear on or near their property with no damage in the next 2 years (90%).

Forty-six per cent of respondents reported that they had experienced the presence of a bear on or near their property with no damage in the last 5 years; 11% had experienced a bear eating from a trash can and 10% from a bird feeder, and 5% reported bears causing damage to their crops/garden and property in the last

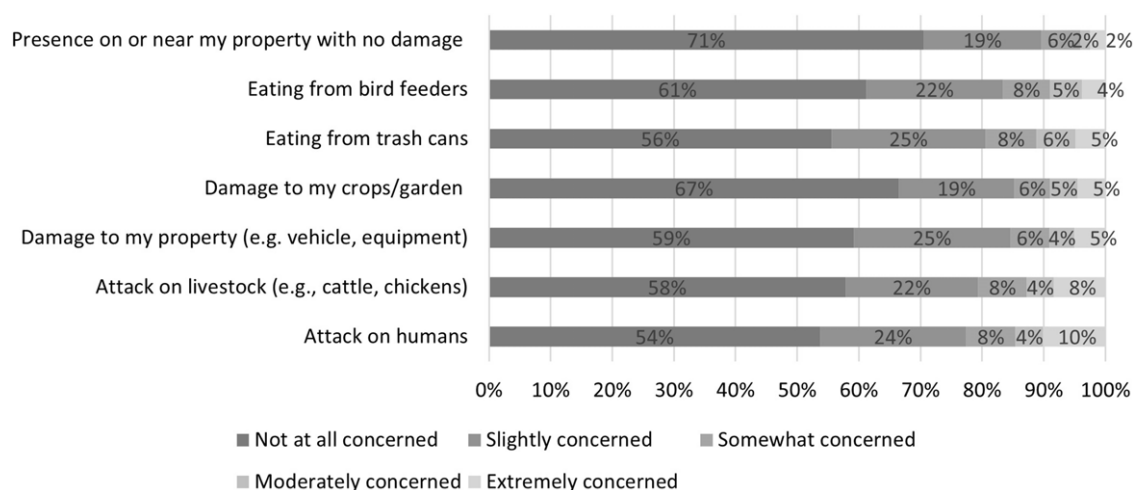


Figure 2. Respondents' concerns regarding various described situations potentially happening within the next 2 years.

Table 1. Respondents' level of agreement with various statements regarding bears and the state wildlife management agency on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Statement	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree	I don't know
Bears are important for the ecosystem	1%	1%	9%	20%	69%	NA
I enjoy knowing that black bears exist (even if I never see one)	1%	1%	6%	14%	78%	NA
Bears can positively contribute to the outdoor economy	2%	1%	18%	20%	59%	NA
Bears and humans can coexist	3%	4%	9%	25%	59%	NA
Bears are a burden I'd rather not have to deal with	59%	15%	15%	7%	5%	NA
TWRA has taken appropriate actions to manage the bear population in my area	5%	5%	40%	24%	25%	0%
TWRA has made satisfactory efforts to control bear-human conflict	4%	6%	32%	29%	28%	0%
TWRA has made a reasonable effort to educate the public about bears	5%	13%	22%	33%	27%	0%
I am confident in TWRA's ability to effectively manage the bear conflict	5%	6%	22%	32%	35%	0%

NA = not applicable; TWRA = Tennessee Wildlife Resources Agency.

5 years. Two per cent and 1%, respectively, had experienced an attack on livestock and a personal attack by a bear.

A cross-tabulation of two variables (prior experience with bears and level of concern) revealed a greater level of concern (Pearson χ^2 statistic < 0.05) among those who had experienced the described situations compared to those who had not. For example, c. 44% of those who had experienced damage to property by a bear were moderately or extremely concerned about experiencing damage in the near future compared to only 7% of those who had not previously experienced such damage. Similarly, 51% of those who had previously experienced damage to their crops/gardens expressed concern regarding future damage versus 7% for those who had not. Findings (i.e., prior experience leading to greater concern regarding similar future experiences) were consistent for the remaining five described situations: 6% of those who had experienced the presence of a bear on or near their property but with no damage expressed concern regarding the presence of a bear on or near their property in the future compared to 2% for those who had not; 63% of those who had experienced an attack expressed concern regarding a future attack versus 14% for those who had not; 33% of those who had experienced a bear eating from trash cans expressed concern regarding a bear eating from trash cans in the near future versus 8% of those who had not; 29% of

those who had experienced a bear eating from bird feeders expressed concern regarding a bear eating from bird feeders versus 7% of those who had not; and 59% of those who had experienced an attack on livestock expressed concern regarding future attacks compared to 12% of those who had not.

Wildlife values of residents and trust and confidence in wildlife agency

Ninety-two per cent of respondents agreed that they enjoyed knowing that black bears exist even if they never saw one, 89% agreed that bears are important for the ecosystem, 84% agreed that bears and humans can coexist, 79% agreed that bears can positively contribute to the outdoor economy and only 11% agreed that bears are a burden that they would rather not have to deal with (Table 1).

Two-thirds (67%) of respondents agreed that they were confident in TWRA's ability to effectively manage the bear conflict, 60% agreed that TWRA had made a reasonable effort to educate the public about bears and 57% agreed that TWRA had made satisfactory efforts to control bear-human conflicts (Table 1). Fifty per cent of respondents agreed that TWRA had taken appropriate actions to manage the bear population in their area.

Table 2. Regression results examining the factors influencing residents' tolerance of black bears, preferred level of sightings and support for regulated hunting to manage bear populations.

Variables	TOLERANCE	SIGHTINGS	SUPPORT HUNTING
CONCERN	−0.381*** (0.134)	−0.375*** (0.140)	0.301* (0.178)
VALUES	0.585*** (0.172)	0.748*** (0.171)	−0.252 (0.202)
TRUST	0.203* (0.108)	0.100 (0.130)	0.111 (0.120)
EXPERIENCE	−1.554** (0.615)	2.898*** (0.618)	0.860 (0.939)
CONFLICT	−0.799*** (0.161)	0.388** (0.173)	0.162 (0.182)
NON-AGGRESSIVE ENCOUNTER	−0.413 (0.304)	−1.658*** (0.305)	−0.236 (0.336)
AGGRESSIVE ENCOUNTER	−0.790*** (0.286)	−0.718** (0.300)	0.810** (0.333)
HUNTER	0.300 (0.238)	0.597** (0.234)	1.509*** (0.291)
MALE	−0.012 (0.201)	0.363* (0.205)	0.519** (0.226)
EDUCATION	0.009 (0.112)	−0.0926 (0.105)	−0.209* (0.124)
INCOME	0.065 (0.063)	−0.005 (0.057)	0.024 (0.063)
TENNESSEE	−0.008** (0.004)	−0.0005 (0.004)	0.005 (0.005)
Constant			0.839 (1.304)
<i>n</i>	521	521	514
P-value	0.0000	0.0000	0.0000
Wald χ^2	165.11	132.07	62.78
AIC	1226.423	1163.999	594.1466

* $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

AIC = Akaike information criterion.

Preferred level of bear sightings and tolerance

The ordered logit regression indicated VALUES ($p < 0.001$), EXPERIENCES ($p < 0.001$), CONFLICT ($p = 0.03$) and HUNTER ($p = 0.01$) were positively associated with residents' preferred level of sightings (i.e., SIGHTINGS), while CONCERN ($p = 0.01$), GENDER ($p = 0.08$), NON-AGGRESSIVE ENCOUNTER ($p < 0.001$) and AGGRESSIVE ENCOUNTER ($p = 0.02$) were negatively associated with preferred level of bear sightings (Table 2). TRUST ($p = 0.44$), TENNESSEE ($p = 0.90$), EDUCATION ($p = 0.38$) and INCOME ($p = 0.93$) were not influential in this.

The ordered logit regression indicated that VALUES ($p < 0.001$), TRUST ($p = 0.06$) and AGGRESSIVE ENCOUNTER ($p < 0.01$) were positively associated with tolerance of the presence of black bears in the area where residents live (TOLERANCE), while CONCERN ($p = 0.01$), EXPERIENCE ($p = 0.01$), CONFLICT ($p < 0.001$) and TENNESSEE ($p = 0.03$) were negatively associated with tolerance. GENDER ($p = 0.95$), EDUCATION ($p = 0.94$), INCOME ($p = 0.30$), HUNTER ($p = 0.21$) and NON-AGGRESSIVE ENCOUNTER ($p = 0.18$) were not associated with tolerance (Table 2).

Support for regulated hunting for bear management

The logit regression examining determinants of residents' support for regulated hunting of bears to manage bear populations in the area where they live indicated that CONCERN ($p = 0.09$), HUNTER ($p < 0.001$) and AGGRESSIVE ENCOUNTER ($p = 0.02$) were positively associated with support for regulated hunting for bear management (i.e., SUPPORT HUNTING), while GENDER

($p = 0.02$) and EDUCATION ($p = 0.09$) were negatively associated with it (Table 2). VALUES ($p = 0.21$), TRUST ($p = 0.36$), EXPERIENCE ($p = 0.36$), CONFLICT ($p = 0.37$), TENNESSEE ($p = 0.31$), INCOME ($p = 0.70$) and NON-AGGRESSIVE ENCOUNTER ($p = 0.48$) were not associated with this (Table 2).

Discussion

Tennessee residents' attitudes towards black bears and their management were influenced by the values and benefits attributed to bears, perceptions of conflict and risk, agency trust and prior experiences with bears; however, sociodemographic factors were less influential. Attitudes towards hunting of black bears were influenced by sociodemographic factors more than cognitive factors, as males and those with less education supported it more than their respective counterparts. Residents expressing greater concern about encounters were less tolerant, preferred seeing fewer bears and were more supportive of hunting. Residents attributing positive values to bears were more tolerant and preferred more sightings. These findings were generally consistent with similar studies that have found individuals' value orientations and perceptions of risk to be predictors of tolerance (e.g., Zajac et al. 2012, Lischka et al. 2019, Siemer et al. 2023). Values were not associated with residents' attitudes towards hunting. Contrary to our findings, Whittaker et al. (2006) concluded that general wildlife value orientation predicted an individual's acceptability of lethal control measures, including public hunts, which we believe may be attributable to numerous factors, including differences in survey context, geographical location and belief scale construction.

Here, agency trust was associated with higher tolerance, which is attributable to residents' confidence in the agency to manage bear-related issues, while Lischka et al. (2019) found that individuals who expressed higher trust in the wildlife agency to effectively manage black bears were less tolerant of the species. However, the difference may be explained by the way this construct is measured. Our measure focused on residents' confidence and satisfaction with the agency's approach towards black bears in the specific area, whereas Lischka et al. (2019) measured trust by the extent to which, in more generic terms, respondents believed the agency shared similar values and goals. Most other similar studies (e.g., Zajac et al. 2012, Cleary et al. 2021, Siemer et al. 2023) have concluded that agency trust influenced perceptions of risk and benefits associated with bears and, consequently, tolerance of their presence. State wildlife agencies in the USA and elsewhere dealing with bear-related issues may take our finding to imply that developing trust with residents could lead to greater tolerance of bear populations. This may be done by investing in education and outreach efforts to inform residents about the ongoing actions and proposed plans in managing bear populations, being transparent and clear on the science related to bear-related benefits and risk and engaging in regular two-way communication with residents to help them understand that the agency has the needed expertise in bear management and listens to and genuinely cares about public concerns regarding bears (Watkins et al. 2021).

Residents' prior experiences of bears negatively impacting humans were negatively associated with tolerance. Similar studies' differing findings that experience (Lischka et al. 2019) and negative experiences (Cleary et al. 2021) with bears are unrelated to tolerance of the species may reflect the novel, more intuitive method that we used to quantify tolerance. Residents' personal experiences with bears were positively associated with preferred level of sightings and not associated with support for regulated hunting. The personal experiences of bear-related negative impacts were inversely related to tolerance, positively associated with preferred level of sightings and not associated with support for regulated hunting. The negative effect on tolerance is expected, but the positive effect on preferred sightings (often used in previous studies to measure tolerance) does not make intuitive sense. It may be that the traditional measure of tolerance (asking about the preferred level of the bear population without adjusting for the current level of the population) is an imperfect instrument for accurately characterizing tolerance. There is a contention that the measurement of tolerance should combine more than one cognitive dimension representing acceptability of change and current assessment of the population (Brenner & Metcalf 2020, Siemer et al. 2023). In the current study, these were respectively captured by preferred level of population change and current perception of the population.

Respondents who perceived aggressive encounters to be conflicts were less tolerant and expressed greater support for hunting than those that did not consider encounters with bears involving aggressive behaviour to be conflicts. The implications of this finding for budget-constrained wildlife agencies in Tennessee and elsewhere are that management efforts in communities experiencing human–bear interactions should prioritize the minimizing of aggressive encounters (e.g., attacks, property damage) more than non-aggressive interactions (e.g., presence with no damage, eating from bird feeders), which our study shows are not influential in determining tolerance for bears. Evidence from studies examining tolerance of large predators has demonstrated that outcomes associated with personal interactions (e.g., positive or

negative) drive perceptions of benefits and costs, which influence tolerance (Lischka et al. 2019, Marino et al. 2021).

While female respondents preferred fewer sightings and were less supportive of hunting than males, gender was unrelated to tolerance. The impact of gender on tolerance is mixed in the literature; however, numerous studies (e.g., Teel et al. 2002, Agee & Miller 2009, Cleary et al. 2021) have concluded that females are less supportive of hunting than males. Similarly to our study, Teel et al. (2002) found that education was negatively associated with support for hunting, and Lischka et al. (2019) found tolerance not to be associated with education. Despite generally proving to be a poor predictor of attitudes towards large predators (Riley & Decker 2000, Kanksy & Knight 2014), the length of time respondents had resided in Tennessee was negatively associated with tolerance in our study but was not associated with preferred level of sightings or support for regulated hunting. Teel et al. (2002) also found no effect of duration of state residence on support for bear hunting. Although hunters preferred seeing more bears and were more supportive of regulated bear hunting, hunting status did not influence tolerance. In contrast, Siemer et al. (2023) found that hunters reported higher tolerance than non-hunters, which the authors attributed to hunters perceiving more bear-related benefits than costs.

Conclusion

This is the first examination of residents' tolerance of the presence of bears and their support for regulated hunting to manage bear populations in a context in which bears are considered to be an important asset in the region's nature-based tourism economy as well as a potential threat in residential areas. Several opportunities exist to extend the current study and further inform the development and maintenance of sustainable local black bear management strategies in East Tennessee. While this study covered a broad population of the residents in the region, the attitudes of non-local residents that operate businesses (e.g., restaurants, tourism outfitters) in some concentrated areas around tourism hotspots (e.g., Gatlinburg) may be different due to the high density of bears and visitor activity in those areas, and, consequently, this is worthy of closer examination. Additionally, although the survey response rate in this study was similar to past studies in the region using randomized residents as the sampling frame, survey participation and the collection of data from those residents that may prefer non-mail participation options could be increased in future studies through the use of a mixed-mode survey format (e.g., mail, telephone, email) as opposed to mail only.

As wildlife habitat is lost to development, people increasingly move near bear-inhabited areas and human–bear interactions become more common, insights from this study of a contested landscape in a developed country will be useful to inform agencies in North America and elsewhere that are looking to improve their assessments or understandings of public tolerance of bears and how aggressive and non-aggressive interactions with humans relate to tolerance and support for management actions such as regulated hunting. We suggest that outreach informing the public about the risks and benefits of bears, building trust and confidence in an agency's efforts and prioritizing efforts to mitigate aggressive encounters with bears will be impactful for increasing tolerance.

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Competing interests. The authors declare none.

Ethical standards. This study was approved by the University of Tennessee's Institutional Review Board for human subjects' research (Approval #: UTK IRB-23-07491-XM).

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