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The influence of social identity on attitudes toward wildlife

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Abstract

Wildlife conservation depends on supportive social as well as biophysical conditions. Social identities such as hunter and nonhunter are often associated with different attitudes toward wildlife. However, it is unknown whether dynamics within and among these identity groups explain how attitudes form and why they differ. To investigate how social identities help shape wildlife-related attitudes and the implications for wildlife policy and conservation, we built a structural equation model with survey data from Montana (USA) residents ($n = 1758$) that tested how social identities affect the relationship between experiences with grizzly bears (*Ursus arctos horribilis*) and attitudes toward the species. Model results ($r^2 = 0.51$) demonstrated that the hunter identity magnified the negative effect of vicarious property damage on attitudes toward grizzly bears ($\beta = -0.381$, 95% confidence interval [CI]: −0.584 to −0.178, $p < 0.001$), which in turn strongly influenced acceptance ($\beta = -0.571$, 95% CI: −0.611 to −0.531, $p < 0.001$). Our findings suggested that hunters' attitudes toward grizzly bears likely become more negative primarily because of in-group social interactions about negative experiences, and similar group dynamics may lead nonhunters to disregard the negative experiences that out-group members have with grizzly bears. Given the profound influence of social identity on human cognitions and behaviors in myriad contexts, the patterns we observed are likely important in a variety of wildlife conservation situations. To foster positive conservation outcomes and minimize polarization, management strategies should account for these identity-driven perceptions while prioritizing conflict prevention and promoting positive wildlife narratives within and among identity groups. This study illustrates the utility of social identity theory for explaining and influencing human–wildlife interactions.

KEYWORDS
Greater Yellowstone Ecosystem (GYE), human–wildlife conflict, hunting, in-group out-group, large carnivores, perceived risk, threatened and endangered species, tolerance

INTRODUCTION

Successful conservation of globally important wildlife species requires favorable social as well as biophysical conditions (Soga & Gaston, 2022). Human dimensions of wildlife scholars have demonstrated that attitudes toward wildlife species are influenced by factors beyond direct experience and demographics such as emotions, social norms, and media portrayals (Landon et al., 2020; Sponarski et al., 2016; Vaske et al., 2021). Underexplored among these social dynamics is whether and to what degree social identities may influence wildlife-related cognitions. Connection and belonging to social groups are powerful drivers of human cognitions and behaviors in numerous settings (Colagè & d'Errico, 2020), but they have received limited attention with respect to wildlife. We investigated how social identity complicates people's responses to direct and indirect experiences with wildlife.

Social psychology research has shown the profound influence of social identity on cognition, where reality is interpreted through the lens of one's socially defined self (Brown, 2020).

Social identity theory posits that individuals, through processes of social categorization and comparison, develop a sense of belonging to certain groups, imbuing that group membership with emotional and value significance (Tajfel et al., 1979). This theory describes how individuals self-categorize into in-groups, seeing themselves as group representatives and acting according to group norms in situations relevant to that identity (Jetten et al., 2006). Social identities lead people to adopt group characteristics, such as attitudes, beliefs, or behaviors, pervade automatic and basic cognitive processes (e.g., attention and perception), and determine how people reflexively respond to environmental stimuli (Van Bavel et al., 2011). Social identity influences on cognitions are so powerful that even arbitrary group memberships can override deeply ingrained biases (Van Bavel et al., 2014). Given its profound influence on human cognitions and behaviors in myriad contexts, social identity likely plays a strong role in determining how humans relate to wildlife.

Human dimensions of wildlife scholars have documented the importance of social groups for explaining differences in people's wildlife-related cognitions, especially between hunters and nonhunters, but more deliberate engagement with social identity theory may provide deeper insights. Some authors have described how occupations and cultural backgrounds determine the experiences people have with wildlife and how they perceive those experiences (Naughton-Treves et al., 2003; Schroeder et al., 2022). For example, hunters experience risk imposed by large carnivores in the field and perceive carnivores as competitors for game (Hogberg et al., 2016; Treves et al., 2013). In contrast, nonhunters may perceive large carnivores more positively or with fascination because of infrequent experience and more indirect, media-influenced exposure to these animals (George et al., 2016). Most human dimensions of wildlife research employing group comparisons describes differences between hunters and nonhunters, finding hunters hold more negative attitudes toward large carnivores (Dressel et al., 2015; Ericsson & Heberlein, 2003; Hogberg et al., 2016; Treves & Martin, 2011). Less explored are questions about how social identity theory might explain how group cohesion, in-group and out-group effect, and other social processes might influence people's translation of experiences with wildlife into attitudes and beliefs about those species.

For instance, hunters are more than simply a stakeholder or interest group; they have a deeply held social identity with values intertwined with wildlife management that are shared by other, related groups. Hunters are seen as integral to North American wildlife management and enjoy celebrated status for their roles in wildlife conservation successes (Heffelfinger et al., 2013), despite problems with this narrative (Peterson & Nelson, 2017). Perhaps because of these aspects of their identity (Loveridge et al., 2007), hunters often petition for the regulated hunting of wildlife species, including large carnivores (Packer et al., 2009). As a traditionally rural activity, hunting is linked to deeply held rural values and norms (Stedman & Heberlein, 2001) that shape attitudes toward wildlife. Hunters often share values and beliefs with other groups, such as those involved in agriculture, conservative politics, gun ownership, and rural communities (Jost et al., 2003). Hunting is strongly connected to gun ownership and political ideology in the United States (Joslyn, 2020), especially because it embodies values of freedom and self-reliance (Siegel & Boine, 2020). Although rural association itself may not be as strongly related to attitudes toward wildlife as is often assumed due to cultural diversification and reduced reliance on natural resources extraction (Skogen, 2003), hunter and associated groups do often share rural identities that focus on protecting their way of life (Skogen & Krange, 2003). Nevertheless, the hunter identity is not homogenous; it includes individuals with diverse values (Ljung et al., 2012). Additionally, the intensity with which individuals hold the hunter identity can vary, with some embracing it casually or seasonally, whereas for others it is central to their daily life, community ties, and political actions.

Hunters and their associated values have been empirically connected to attitudes toward wildlife management, land use, and development. In the United States and Europe, debates over large carnivore conservation often reflect societal conflicts about rural futures, including those of hunters (van Eeden et al., 2021; Wilson, 1997). Similar social issues underlie wolf (*Canis lupus*) reintroduction disagreements in the western United States (Wilson, 1997): differential power among social groups (i.e., rural communities vs. environmental movement [Richardson, 2022; Skogen & Krange, 2003]); protection of some groups' property rights; and divergent environmental values among groups (Fischer, 2021; Manfredo et al., 2021). Hunters' and nonhunters' identities entwine with these social identity processes to affect wildlife conservation efforts in the western United States, including the ongoing recovery of large carnivores. For example, Montana (USA) hunters are more likely than nonhunters to believe grizzly bear (*Ursus arctos horribilis*) populations are too large, an effect stronger than direct experience, agency trust, and emotion combined (Nesbitt et al., 2023).

Given the power of social identity to influence even basic cognitions and the strong evidence that the hunter identity informs wildlife-related cognitions, we were curious whether hunters' and nonhunters' wildlife attitudes are shaped simply by their group memberships or whether identity-related social processes could better explain attitude differences and formation. Most extant research has documented how attitudes differ between hunters and other groups (Ericsson & Heberlein, 2003; Grima et al., 2021; Schroeder et al., 2022) but not whether social identities play integral roles in determining how wildlife experiences are interpreted and how cognitions are subsequently shaped. For example, rather than just holding more negative attitudes, it could be that the hunter identity predisposes hunters to interpret wildlife-related experiences more negatively than nonhunters because to hunters the experiences of in-group members (i.e., other hunters) are more important than those of out-group members (i.e., nonhunters). If true, the role of social identity in wildlife contexts may be far more significant than previously known, with important implications for managers and conservationists.

Montana provided an opportune study area to explore these questions. Here, globally important grizzly bear populations are expanding outside the Greater Yellowstone Ecosystem and the Northern Continental Divide Ecosystem. Because the US

Fish and Wildlife Service is considering removing some populations from threatened status under the Endangered Species Act and the state wildlife agency (Montana Fish, Wildlife and Parks [FWP]) is finalizing a grizzly bear management plan, it is crucial to understand the factors shaping the social landscape and its receptivity to grizzly bears. More broadly, the interplay of social identity, cognitive processes, and human–wildlife interactions observed here may offer insights for other instances around the globe where expanding wildlife ranges intersect human communities. We investigated the structural relationships between experiences people reported with grizzly bears, their cognitions toward the species, and whether social identity mediated these relationships. We hypothesized that social identities shape cognitive processes regarding wildlife because the relationships between experiences with grizzly bears and both emotional disposition and attitudes toward grizzly bears are significantly different for hunters than they are for nonhunters. We also assessed how variation in population belief (i.e., that grizzly bear populations are too small or too large) is collectively explained by hunter identity, experiences with grizzly bears, emotional disposition, attitudes toward grizzly bears, and significant interactions.

METHODS

Survey

We collected data with a mail-back questionnaire to Montana residents administered in 2019–2020 (Institutional Review Board case number 172-19). Ten people pretested the questionnaire, including 4 graduate students, 2 faculty, and 4 FWP employees. We purchased a stratified random sample from Dynata of 5350 addresses of adults living in an occupied dwelling in Montana. To administer the survey, we used a modified tailored design (Dillman et al., 2014) with 3 questionnaire mailings, each 2–4 weeks apart. A detailed description of the study area is in Nesbitt et al. (2023).

Measures

We included psychometric variables previously shown to influence support for or opposition to large carnivore conservation, emotional disposition, and attitudes toward grizzly bears (Table 1). Attitudes and emotional disposition are directly related to acceptance of several wildlife species, including grizzly bears (Nesbitt et al., 2023; Sponarski et al., 2015; Vaske et al., 2021). For reference, attitudes are the evaluations of an object that may be directed toward people, things, or policies (Riley & Decker, 2000), and emotions are psychosomatic responses to stimuli based on direct and indirect experience (Damasio, 1995). We measured emotional disposition toward grizzly bears, a common measure in human dimensions of wildlife research (Jacobs et al., 2012). We followed past research investigating the relationship between attitudes and emotions in the context of wildlife management (Landon et al., 2020; Sponarski et al., 2016), where the best predictive models used attitudes as a mediator between emotional disposition and support for specific management actions (Vaske et al., 2021).

We used 2 measures of past experiences with grizzly bears: self-reported neutral experiences, such as watching a grizzly bear from afar, and a self-reported measure of vicarious property damage, which refers to incidents of property damage caused by grizzly bears that are observed or heard about secondhand. Although direct interactions with wildlife affect individuals' attitudes and beliefs toward a particular species (Lischka et al., 2019), recent work in Montana shows that social interactions about experiences with grizzly bears have even more of an effect (Nesbitt et al., 2023). We suspect this is true because direct encounters with grizzly bears are fairly infrequent in Montana (i.e., 31.3% reported vicarious property damage, 14.6% fearful experience, and 4.5% actual property damage). As such, we included in our analyses vicarious property damage rather than direct negative experiences.

We selected normative beliefs about the grizzly bear population size as our dependent variable, which refers to the degree to which respondents believe the current grizzly bear population size in Montana is just right, too small, or too large. This variable aligns with one of the 5 indicators of tolerance (Kansky & Knight, 2014) and has been employed in previous research as a means of assessing public acceptance toward large carnivores (Riley & Decker, 2000).

We used multi-item scales to measure attitudes toward grizzly bears and emotional dispositions (Table 1). We measured scale reliability for composite variables with a Cronbach's alpha (α) cutoff of 0.65 (Vaske, 2008). After creating composite variables with the mean of item responses, we removed respondents with incomplete data (46 observations). In our model, the social identity variable was dichotomous (hunters or nonhunters). Emotional disposition, gauging fear and anxiety levels toward grizzly bears, was measured on a −3 to +3 scale across 3 items. We assessed attitudes toward grizzly bears with Likert-type items on a scale from 1 (*strong negative attitude*) to 5 (*strong positive attitude*). Vicarious property damage and neutral experiences were both measured as dichotomous variables. Finally, respondents' normative beliefs about the grizzly bear population size in Montana were measured on an ordinal scale of 1–5 (1 = *population is much too low or small* to 5 = *population is much too high or large*). For more detailed item descriptions, see Nesbitt et al. (2023).

All descriptive statistic estimates were weighted to provide inference with 95% confidence and a 3.5% sampling error for the population of adult resident Montanans (hereafter Montanans). Weighting involved a 3-step procedure including a base weight to account for selection probability, a modification based on nonresponse, and a calibration based on population control totals from the US Census and known grizzly bear ranges (Haziza & Beaumont, 2017).

Analyses

To assess potential differences in grizzly bear experiences based on social identity, we conducted a comparative analysis with

TABLE 1 Means (SD) of single-item and composite variables in a survey of Montanans regarding grizzly bears.

Variable*	Hunter ($n = 901$)	Nonhunter ($n = 774$)	Total ($n = 1675$)
Normative population belief	3.57 (1.02)	2.90 (0.92)	3.23 (1.04)
Emotional disposition	0.08 (1.72)	−0.45 (1.76)	−0.16 (1.77)
Nervous to relaxed	−0.44 (1.93)	−1.07 (1.85)	−0.71 (1.93)
Upset to pleased	0.73 (1.90)	0.48 (2.09)	0.60 (2.00)
Scared to not scared	0.04 (1.99)	−0.64 (2.00)	−0.27 (2.02)
Attitudes toward grizzly bears	3.51 (0.79)	3.92 (0.63)	3.70 (0.75)
Neutral experiences	1.82 (0.38)	1.71 (0.45)	1.75 (0.43)
Seen from afar	1.73 (0.44)	1.68 (0.47)	1.71 (0.45)
Seen outside a vehicle	1.66 (0.48)	1.43 (0.50)	1.55 (0.50)

*Normative population beliefs and attitudes toward grizzly bears ($\alpha = 0.93$) (composite attitudes from Nesbitt et al. [2023]) quantified on a 1–5 scale. Emotional dispositions ($\alpha = 0.91$) range from −3 to 3 (3, positive end of the spectrum) (e.g., from nervous to relaxed: −3, nervous; 3, relaxed). Neutral experiences are dichotomous variables (1, no; 2, yes) scored as 2 in the occurrence of either seeing a grizzly bear from afar or from outside a vehicle.

data collected from 2 groups: nonhunters ($n = 774$) and hunters ($n = 901$). We tested for significant differences between hunters' and nonhunters' direct and vicarious experiences with independent *t*-tests, applying a Bonferroni correction to adjust for multiple comparisons and setting the significance cutoff at $p < 0.05$.

We used a structural equation model (SEM) to investigate the influence of social identities on individuals' responses to experiences with grizzly bears (Figure 2). The initial predictor variables in the model were vicarious property damage and neutral experiences with grizzly bears. We assessed the association between these experience types and two outcome variables: emotional disposition and attitudes toward grizzly bears. Following past human dimensions of wildlife research, we included attitudes toward grizzly bears as a mediating variable for the influence of emotional disposition on acceptance (Vaske et al., 2021). We incorporated a dichotomous hunter or nonhunter social identity variable in the model and tested the effect of its interaction with experiences on emotional disposition as well as on attitudes toward grizzly bears. We also explored the direct relationship between social identity and attitudes toward grizzly bears because hunter identity is linked with negative attitudes toward large carnivores. Finally, we measured the influence that attitudes, emotional disposition, vicarious property damage, neutral experiences, and hunter identity had collectively on normative population beliefs.

We estimated all models with the lavaan package (Rosseel, 2012) in R (R Core Team, 2022) and the robust full information maximum likelihood method. We assessed model fit with recommended criteria (Hu & Bentler, 1999), specifically the root mean square error of approximation <0.06, the standardized root mean square residual <0.09, and values for the comparative fit index and non-normed fit index >0.95.

RESULTS

We received 1758 responses to the survey. There were 688 returned by the US Postal Service as undeliverable, making the overall response rate 37.7% (sampling error 3.5%). Montanans reported grizzly bear populations in Montana were slightly too large ($M = 3.31$, range 1–5), had positive attitudes toward grizzly bears ($M = 3.82$, range 1–5), and held slightly negative emotional dispositions toward grizzly bears ($M = -0.37$, range −3 to 3). Fifty-two percent identified as hunters (48% as nonhunters), 69% reported at least one neutral experience with a grizzly bear, 31% knew people whose property had been damaged by grizzly bears, and 15% reported having fearful interactions with grizzly bears. Complete descriptive statistics are in Nesbitt et al. (2023).

Hunters were 34% more likely to report seeing grizzly bears from afar ($t = 2.26$, $p = 0.02$), 64% more likely to report a fearful interaction with a grizzly bear ($t = 7.84$, $p < 0.01$), and 75% more likely to have experienced direct property damage ($t = 5.24$, $p < 0.01$). Hunters were also 43% more likely to experience vicarious property damage ($t = 7.47$, $p < 0.01$), ostensibly because hunters' social networks contain more hunters (Figure 1).

The root mean square error of approximation for our model (Figure 2) was 0.022, standardized root mean square residual was 0.001, and comparative fit index was 0.998. The final model explained 51% of the variance in normative population beliefs.

Neutral experiences with grizzly bears were associated with more positive emotional dispositions toward grizzly bears ($\beta = 0.395$, 95% confidence interval [CI]: 0.248 to 0.542, $p < 0.001$) but significantly more so for nonhunters, as indicated by a significant negative interaction between social identity and neutral experiences ($\beta = -0.330$, 95% CI: −0.594 to −0.066, $p = 0.009$). Social identity showed a positive direct influence on emotional disposition ($\beta = 0.405$, 95% CI: 0.177 to 0.631, $p < 0.001$), suggesting hunters are less afraid of grizzly bears than nonhunters regardless of their experiences.

Emotional disposition toward grizzly bears was significantly related to attitudes ($\beta = 0.368$, 95% CI: 0.328 to 0.408, $p < 0.001$), whereas neutral experiences had only a modest direct positive effect on attitudes ($\beta = 0.082$, 95% CI: 0.040 to 0.124, $p < 0.001$). Social identity and vicarious property damage were negatively related to attitudes only through a substantial interaction ($\beta = -0.381$, 95% CI: −0.584 to −0.178, $p < 0.001$),

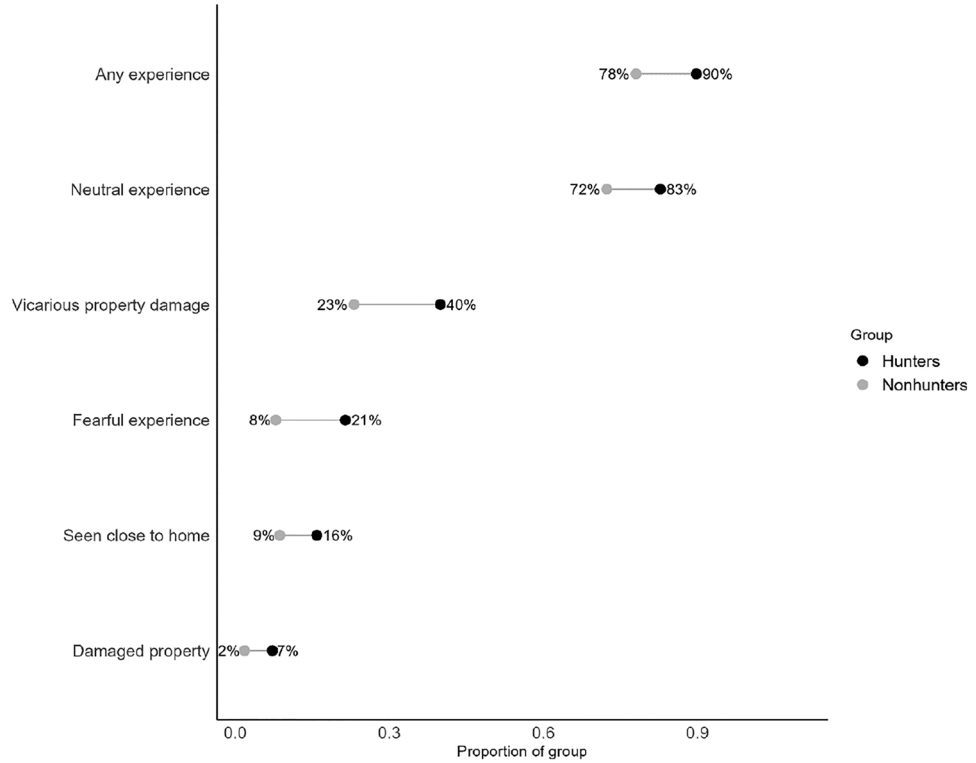

FIGURE 1 Frequency of different types of experiences with grizzly bears among hunters (black circles) ($n = 901$) and nonhunters (gray circles) ($n = 774$).

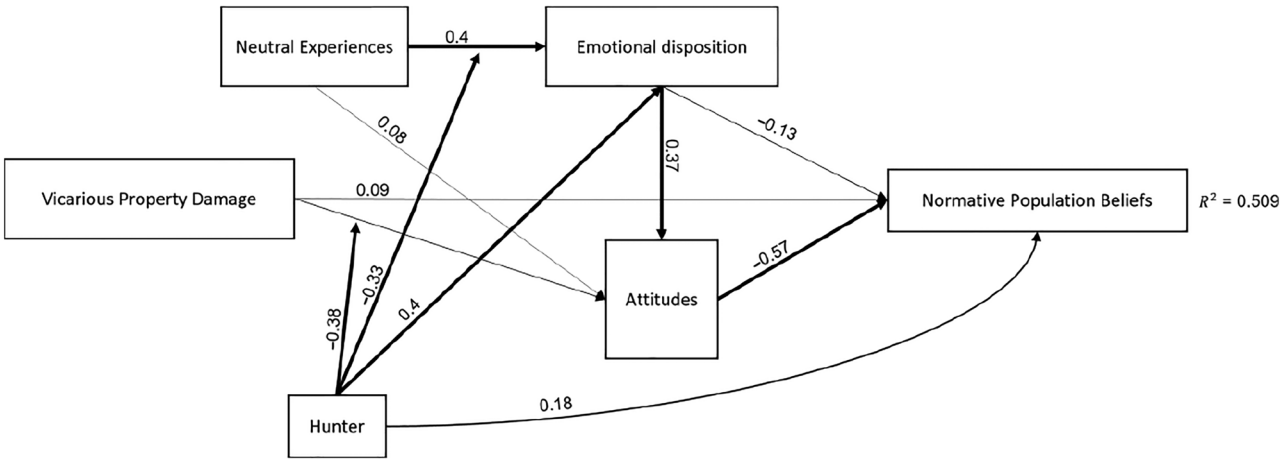

FIGURE 2 Structural equation model of Montanans' cognitions toward grizzly bears based on survey data with standardized path coefficients representing expected change in one variable as a function of change in another in SD units (arrow thickness, proportional to strength of path coefficients; arrows pointing to other arrows indicate significant interactive effects between two variables [i.e., boxes where arrows originate] on another variable [i.e., boxes where arrows point]).

where vicarious property damage had a large negative effect on hunters' attitudes toward grizzly bears but no significant effect on nonhunters' attitudes (Figure 3). Attitudes toward grizzly bears were significantly related to normative beliefs about grizzly bear populations ($\beta = -0.571$, 95% CI: −0.611 to −0.531, $p < 0.001$). Similarly, emotional dispositions were also significantly related to these beliefs ($\beta = -0.127$, 95% CI: −0.172 to −0.082, $p < 0.001$). Social identity had a direct and positive influence on normative beliefs about grizzly bear populations ($\beta = 0.179$, 95% CI: 0.135 to 0.223, $p < 0.001$), as did vicarious property damage ($\beta = 0.086$, 95% CI: 0.044 to 0.128, $p < 0.001$).

In sum, attitudes toward grizzly bears had the most substantial total effect on normative beliefs about grizzly bear populations ($\beta = -0.571$, 95% CI: −0.611 to −0.531, $p < 0.001$), followed by emotional disposition ($\beta = -0.337$, 95% CI: −0.421 to −0.253, $p < 0.001$), hunters' vicarious property damage

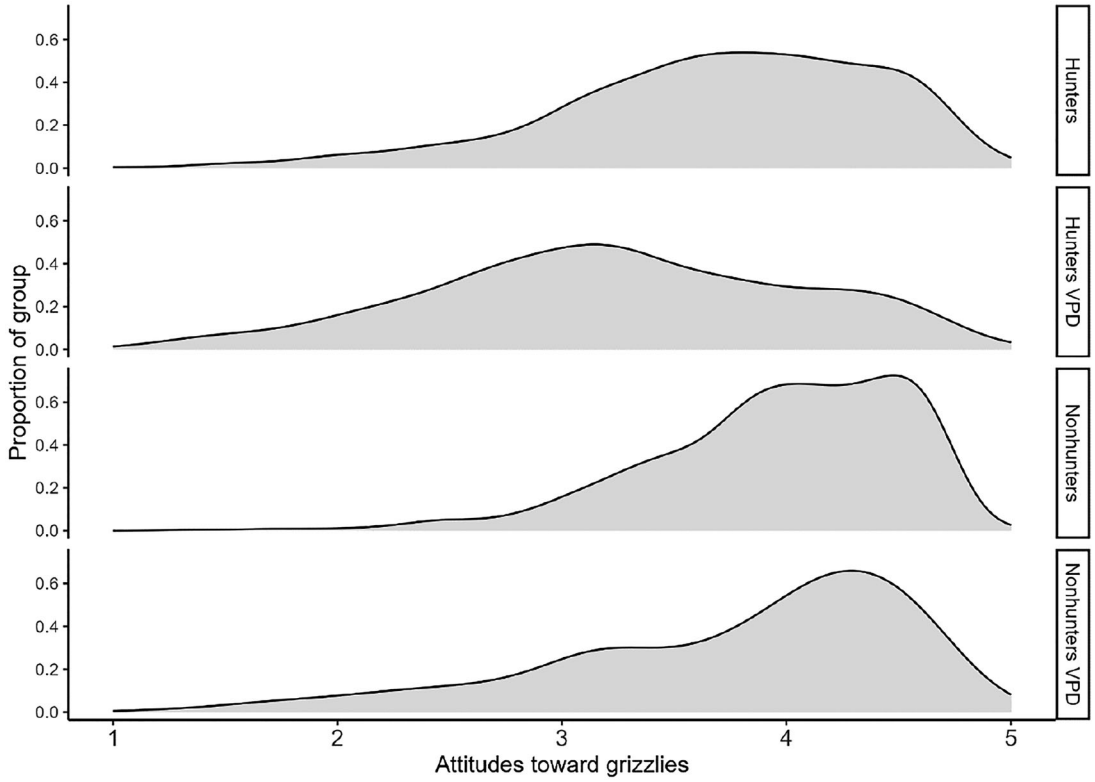

FIGURE 3 Distribution of attitudes toward grizzly bears across an attitude scale ranging from negative (1) to positive (5) for different groups. We include four groups here to show the significant interactive effect ($\beta = -0.381$, 95% CI: −0.584 to −0.178) of social identity and vicarious property damage (VPD) on attitudes toward grizzly bears (top to bottom): hunters who have not experienced vicarious property damage, hunters who have experienced vicarious property damage, nonhunters who have not experienced vicarious property damage, and nonhunters who have experienced vicarious property damage.

($\beta = 0.218$, 95% CI: 0.079 to 0.357, $p = 0.002$), nonhunters' neutral experiences ($\beta = -0.179$, 95% CI: −0.303 to −0.055, $p = 0.004$), and vicarious property damage ($\beta = 0.112$, 95% CI: 0.043 to 0.181, $p < 0.001$).

DISCUSSION

Effect of social identity and in-group dynamics

In Montana, we found that social identities were strongly related to attitudes toward and ultimately the acceptance of grizzly bears but not in ways traditionally assumed. Rather than a direct effect on attitudes, social identity was related to attitudes through an interaction effect with vicarious property damage, such that vicarious property damage had a negative effect on hunters' attitudes toward grizzly bears but no effect on nonhunters. In SEM, direct effects refer to the influence one variable has on another without mediation, whereas indirect effects refer to the influence one variable has on another through one or more mediating variables. Direct and indirect effects are estimated through regression analyses within the SEM considering the relationships between all variables in the model, showing both the simple and more complex relationships. We also found a significant negative interaction effect of social identity and neutral experiences on emotional disposition, whereas neutral experiences had a positive effect but only for nonhunters. These findings illustrate that social identities can be foundationally important for understanding why people hold the attitudes they do toward globally important wildlife species.

Two mechanisms may explain these social identity interaction effects, both of which could exacerbate polarization between groups. First, the different effects of vicarious property damage on hunters versus nonhunters may be due to a within-group social relationship mechanism, whereby attitudes are affected by the experiences of others only if they are in-group members. Second, the different effects of neutral experiences on hunters versus nonhunters may manifest because of an "identity-as-lens" mechanism in which experiences are interpreted differently depending on identities (Van Bavel et al., 2011). Specifically in this case, hunters may dismiss the relevance of neutral experiences, leaving their attitudes unaffected, because doing otherwise would contradict norms within the identity group. We believe there is strong evidence for the within-group social relationship mechanism. Although the identity-as-lens mechanism remains plausible, the significant interactive effect of neutral experiences and social identity on emotional disposition might be better explained by the high emotional disposition of hunters, which precludes increases regardless of experiences. In other words, it might be that

TABLE 2 Summary of results of a structural model of Montanans' cognitions toward grizzly bears based on survey data (standardized regression coefficients).

Dependent variable	Independent variable	*B* (SE)	z	r^2
Direct effects				
NPBs	Attitudes	−0.571 (0.020)	−24.880*	0.51
	Emotional disposition	−0.127 (0.023)	−5.575*	
	Hunter	0.179 (0.022)	8.038*	
	VPD	0.086 (0.021)	4.049*	
Attitudes	Emotional disposition	0.368 (0.020)	17.235*	0.28
	VPD	0.039 (0.074)	0.601	
	Neutral	0.082 (0.021)	3.878*	
	VPD × hunter	−0.381 (0.024)	−3.677*	
Emotional disposition	Neutral	0.395 (0.076)	1.630*	0.07
	Hunter	0.405 (0.116)	3.479*	
	Neutral × hunter	−0.330 (0.134)	−2.450*	
Total effects on NPBs				
	Attitudes	−0.571 (0.020)	−24.880*	
	Emotional disposition	−0.337 (0.084)	−8.024*	
	Hunter	0.042 (0.075)	1.120	
	VPD	0.112 (0.069)	3.246*	
	VPD × hunter	0.218 (0.139)	3.137*	
	Neutral × nonhunter	−0.179 (0.124)	−2.887*	

Abbreviations: NPB, normative population beliefs; VPD, vicarious property damage.
*$p < 0.05$.

hunters' baseline fear of grizzly bears is so low to begin with that no manner of experiences could lower it further, whereas the baseline fear among nonhunters had room to be (and was) lowered by neutral experiences. Our results also showed a potential for future polarization between hunters and nonhunters in Montana. Hunters were more likely to have negative experiences with grizzly bears and hear about others' negative experiences (Figure 1) and to care more deeply about others' experiences because they disproportionately come from in-group members (Figure 1). Thus, hunters' attitudes toward grizzly bears were more negatively affected by those stories (Figure 3).

We did not find a direct effect of social identity on attitudes toward grizzly bears (Table 2), which does not support the hypothesis that hunters hold more negative attitudes toward grizzly bears simply because they are hunters or that vicarious property damage necessarily causes attitudes to sour regardless of identity. Instead, only hunters who had experienced vicarious property damage held more negative attitudes (Figure 3). This suggests a more complex mechanism than confirmation bias where hunters' established attitudes are reinforced by experience.

We suspect this interaction is better explained by three interrelated facts. First, people can only experience vicarious property damage through their relationships with other people. Second, hunters are hearing these stories more often than nonhunters (Figure 1). Third, these stories are likely disproportionately coming from other hunters because they have simply had more of these experiences than nonhunters (Figure 1).

Humans favor in-group members (Tajfel et al., 1971), the relationship between information sources and recipients determines the response (Jennings, 2019), and people often seek information from in-group members when facing risk and uncertainty (Jennings, 2019; Taber & Lodge, 2006). Although our data preclude conclusions about causal mechanisms, the more negative attitudes toward grizzly bears we observed among hunters who had experienced vicarious property damage may stem from an increased sense of trust in or empathy for in-group members or an enhanced ability to imagine themselves as victims when hearing about other hunters' experiences (Harris, 2007; Kahneman & Tversky, 1982). Similarly, but in reverse, nonhunters' attitudes toward grizzly bears may be less affected by vicarious property damage because they hear fewer stories overall, and, even when they do, they are more likely to involve out-group members whose experiences they are more inclined to dismiss. Our finding of no direct effect of social identity on attitudes toward grizzly bears seemingly contradicts previous research on hunters' attitudes toward large carnivores, namely, wolves (Dressel et al., 2015; Ericsson & Heberlein, 2003; Hogberg et al., 2016; Treves & Martin, 2011), but qualitative investigations show attitudes toward wolves are more complex than contempt for the species (Figari & Skogen, 2011; Richardson, 2022). No study has quantitatively tested interactions between social identity and potential antecedents to attitudes (Dressel et al., 2015; Ericsson & Heberlein, 2003; Hogberg et al., 2016; Treves et al., 2013). Our findings may be specific to grizzly bears or to the northern Rocky Mountains,

but we suspect the structural analysis approach adopted here, specifically our inclusion of interaction terms, revealed the significance of this social identity effect where it otherwise may have existed but gone unnoticed.

The effect of social identity we observed may explain disparities in previous studies that did not examine group dynamics. Previous research shows that allowing hunting can have positive effects on relationships between community members and wildlife managers by addressing conflicts and allowing benefits from wildlife to accrue (Loveridge et al., 2007) and conversely that legal hunting does not improve attitudes toward large carnivores (Browne-Nuñez et al., 2015; Hogberg et al., 2016). Implementing a hunting season for grizzly bears may serve as a psychological buffer against perceived threats, potentially altering risk perceptions (embedded here in our measure of attitudes) and moving the locus of control closer to hunters, reducing feelings of imposition (Richardson, 2022). Although allowing hunting may increase acceptance of grizzly bears among hunters, the effectiveness of this strategy to improve attitudes among nonhunters is uncertain and likely dependent on myriad contextual variables. Furthermore, even if the implementation of a hunting season does not directly change nonhunters' attitudes toward grizzly bears, it might undermine their normative population beliefs (i.e., cause more to believe the population is too small), thereby reducing their satisfaction with grizzly bear management (Nesbitt et al., 2023).

We found emotional disposition had a significant positive effect on acceptance of grizzly bears through a direct effect on normative population beliefs and an effect mediated by attitudes. Put simply, those who were less fearful of bears were more accepting of higher population numbers and had more positive attitudes, which was also associated with more acceptance. The significant role of emotional disposition aligns with previous findings showing the strong effect of emotions on wildlife-related beliefs and acceptability of management actions (Slagle et al., 2012; Vaske et al., 2013). Our results also showed that social identity is related to emotional disposition toward grizzly bears; hunters were less fearful than nonhunters, which in turn bolstered their attitudes and acceptance. This suggests emotional disposition is an important mechanism stabilizing attitudes toward grizzly bears and implies that vicarious property damage is most likely to worsen attitudes of fearful hunters. Although nonhunters without any experiences with grizzly bears were more afraid than hunters, we found their emotional dispositions were improved by neutral experiences with grizzly bears, more so than those of hunters. Hence, management strategies could seek to bolster positive or neutral experiences with grizzly bears to reduce nonhunters' fear and improve their attitudes.

Pitfalls of and promises for avoiding polarization

Preventing polarization among identity groups is likely beneficial for conservation of imperiled species and large carnivores, such as grizzly bears. We observed signs that, although not yet pronounced, polarization might worsen over time because grizzly bear encounters appear to have an outsized negative effect on hunters, which could eventually worsen their attitudes more than nonhunters (Figure 4). Deepening the division, nonhunters could be underestimating the negative consequences of others' conflicts with grizzly bears and dismissing the important lived experiences of out-group members (Halm, 2020). Today, Montana hunters' attitudes toward grizzly bears are still relatively positive, even compared to nonhunters (Figure 3). However, as grizzly bear populations continue to grow and bears expand into areas populated by humans (and humans develop into areas inhabited by grizzly bears), conflicts between grizzly bears and people may increase.

Our results suggest that future negative experiences with grizzly bears will have an outsized effect on hunters, either directly or vicariously, and cause their attitudes to worsen, whereas nonhunters' attitudes will be less affected (Figure 3). Such divergence in attitudes could impede effective communication between groups (Stavrakakis, 2018), increase polarization, or undermine support for conflict mitigation and compensation efforts. Polarization, in turn, could exacerbate intergroup conflicts or noncompliance with harvest regulations (Liberg et al., 2011). Moreover, people tend to overestimate the extremity of their opponents' views (Van Boven et al., 2012), triggering a self-reinforcing cycle of overperceiving and reacting to polarization (Wilson et al., 2020). If hunters believe others are dismissing their concerns about grizzly bears, they may be more likely to react negatively to conflicts with these animals, creating a downward spiral of polarization. Further research is necessary to determine whether and how these dynamics manifest in polarization between other identity groups, such as anti-hunters and livestock producers, and in other geographies outside North America, or with respect to other large carnivores or wildlife species. Regardless, if or when polarization does occur, productive discussions are more difficult, and mutually acceptable policies are challenging to craft (Heltzel & Laurin, 2020).

To prevent or mitigate the effects of polarization, it may be beneficial to amplify voices of in-group members who hold more centrist attitudes because their messages are more likely to resonate with in-group peers (Figure 4). Leveraging personal sources of information may be more effective than relying on agency-based or news media sources because of motivated reasoning during information perception and processing (Jennings, 2019; Taber & Lodge, 2006). Additionally, collaborative interventions could build shared understanding across groups. For example, work by conservationists and ranchers in Europe to install bear-resistant fencing built trust among participants, promoted a shared sense of responsibility, and fostered understanding among previously polarized in-group and out-group members (Preston, 2023). Other possible approaches to avoid polarization include emphasizing groups' shared commitments or values (e.g., to outdoor-based economies) rather than differences, and using language that indicates shared identities (e.g., Montanans) rather than divisions (Fritsche et al., 2013). Another approach that might help counteract polarization involves efforts to reduce the perceived frequency of wildlife conflicts or shift the focus toward more positive or neutral

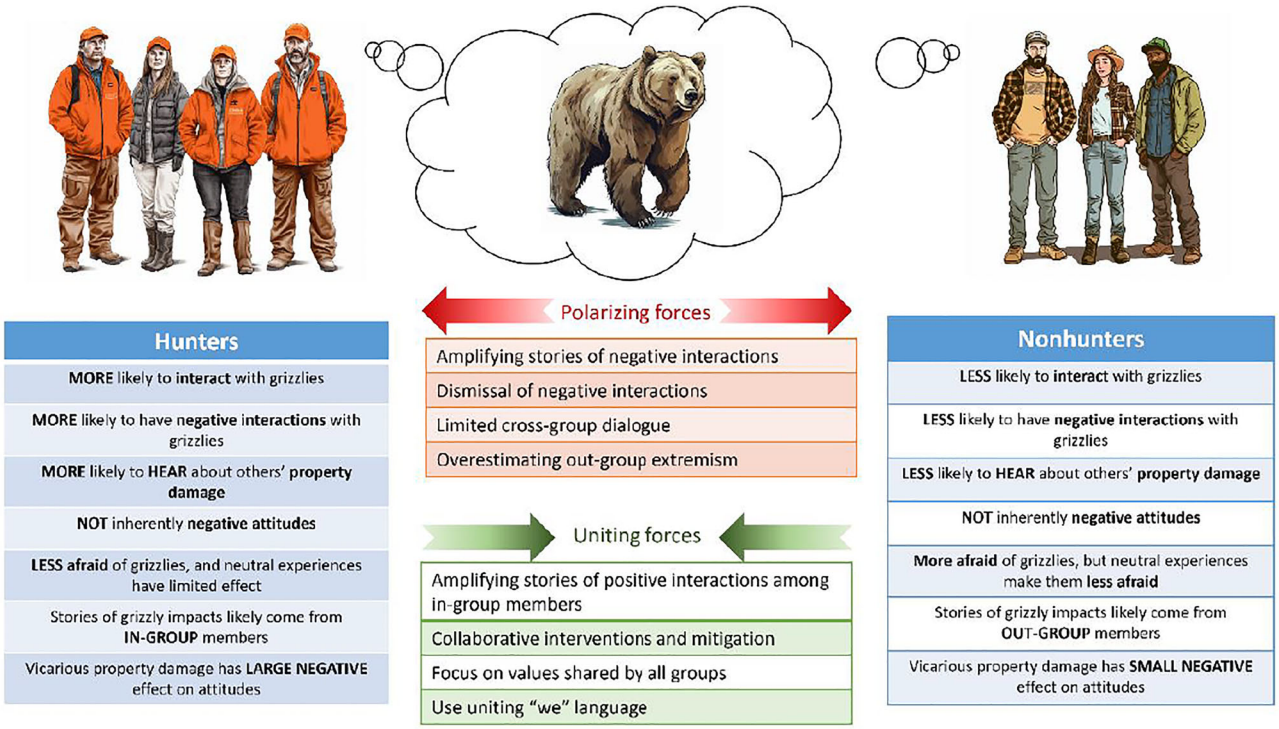

FIGURE 4 Comparative traits, polarization dynamics, and uniting strategies for hunters and nonhunters relative to their attitudes toward grizzly bears. The polarizing forces that could worsen divisions are contrasted with uniting factors that might bridge the gap.

experiences. Highlighting the rarity of negative incidents and amplifying positive examples of coexistence could help decrease perceived risk. Conflict prevention and mitigation measures, such as securing bear attractants like garbage and more extensive public education on bear behavior and safety (Baruch-Mordo et al., 2011), have the potential to influence not only direct participants, but also people in participants' social networks who hear of these positive or neutral experiences with wildlife.

Limitations and future research

In acknowledging the scope and contributions of our study, it is also important to recognize its limitations and highlight opportunities for future research. Measures of identity strength and salience were not directly assessed; thus, subsequent studies might investigate the intensity of individuals' identification with their social groups, such as hunting, to understand the impact on wildlife-related attitudes more deeply. Moreover, this research was cross-sectional, whereas longitudinal approaches would allow for observing the evolution of group cognitions over time, particularly in response to changing wildlife management policies or population trends. Experimental interventions could also be tested for their effectiveness in modifying attitudes within identified social groups. Additionally, expanding the research to other regions and species could verify the generalizability of our findings. Addressing these areas could refine understanding of how social identity intertwines with wildlife conservation, informing strategies that resonate with the diverse values and identities within human–wildlife ecosystems.

Social identity plays an important and underappreciated role in shaping attitudes toward globally important wildlife species like grizzly bears. Our findings suggest that hunters may have more negative attitudes toward grizzly bears than nonhunters because of social interactions that relay stories of negative experiences with grizzly bears among in-group members. These negative interactions with grizzly bears are more likely to occur within the hunting in-group, likely more influential for hunters because they have affected fellow group members, and less likely to matter to nonhunters because out-group members are disproportionately affected. This has several meaningful implications for conservation, including elevating the importance of conflict prevention and mitigation, sharing coexistence success stories, and engaging in-group members in positive dialogue about the species (Figure 4). Social identity theory provides a useful but underused framework for understanding how group dynamics influence wildlife-related attitudes and behaviors. Management strategies that account for the social identities and values of stakeholders can reduce intergroup conflict and promote collaboration, ultimately leading to better outcomes for wildlife and people.

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