




RESEARCH NOTE

Contextualizing sociodemographic differences in Tibetan attitudes toward large carnivores

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Abstract

Fostering human–wildlife coexistence necessitates a thorough and nuanced grasp of local attitudes toward wildlife. Attitudes can vary substantially based on the sociodemographic backgrounds of individuals within a society. This study examines Tibetan attitudes toward large carnivores, emphasizing the importance of contextualization in discerning the effects of sociodemographic factors on attitudes. We began by analyzing existing research on Tibetan attitudes toward wildlife in China, identifying previously studied sociodemographic variables. We then executed an online survey to evaluate the affective, behavioral, cognitive, and overall attitudes of ethnic Tibetans in China toward snow leopards (*Panthera uncia*), gray wolves (*Canis lupus*), and brown bears (*Ursus arctos*). Our findings show that while factors such as gender, age, religious identity, and level of education shape these attitudes, their influence differs depending on the specific attitude component and the target animal under examination. Therefore, making broad generalizations about sociodemographic differences in attitudes can be misleading. It is imperative for attitude research to clearly define the attitude component (what type of attitude), object (attitude toward what), and circumstance (attitude in which situation) being

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studied. Conducting ethnographic fieldwork in collaboration with local cultural experts can deepen our understanding of local perspectives and the ways sociodemographic factors influence attitudes. Such insights are pivotal for developing conservation strategies attuned to local sociocultural contexts.

KEYWORDS

ABC model, brown bear, gray wolf, snow leopard, Tibet

1 | INTRODUCTION

Fostering human–wildlife coexistence in shared landscapes is a worldwide concern (Clark & Rutherford, 2014; Gao, Lambert, et al., 2023; Gao, Lee, et al., 2023; König et al., 2020; Nyhus, 2016). Addressing this challenge in any specific context requires a thorough and nuanced understanding of the multifaceted interactions between people and wildlife and the varied perspectives of different individuals. Many factors shape the dynamics of human–wildlife interactions and related human–human interactions. These include the predispositions of human and wildlife participants and the intricate web of ecological, social, and cultural processes in which these interactions are embedded (Gao & Clark, 2023; Gao, Lambert, et al., 2023; Gao, Lee, et al., 2023).

A critical variable is the attitudes of people living in proximity to wildlife (Broekhuis et al., 2020; Dickman, 2010; Johnson et al., 2021; Whitehouse-Tedd et al., 2021). An attitude is a person's overall evaluation of an “attitude object” along dimensions such as pleasurable–unpleasurable, favorable–unfavorable, and beneficial–harmful (Ajzen, 2001; Crano & Prislin, 2008). This attitude object can be a tangible entity (e.g., snow leopards), an action (e.g., snow leopard conservation), an event (e.g., livestock depredation by snow leopards), or a policy (e.g., compensation for human–wildlife conflict).

The ABC model of attitudes, a popular framework in social psychology, divides attitudes into three segments: Affective, Behavioral, and Cognitive (Breckler, 1984; Ostrom, 1969). Here, the “Affective attitude” encapsulates a person's emotional response to an attitude object; the “Behavioral attitude” denotes overt actions or behavioral tendencies; and the “Cognitive attitude” encompasses beliefs, knowledge, perceptions, and thoughts (Breckler, 1984). Previous studies suggest that understanding attitudes through this tripartite lens can offer valuable insights into local perspectives toward wildlife (e.g., Perry et al., 2022).

Attitudes toward wildlife are often divergent and heterogeneous. In the field of human–wildlife conflict and coexistence, many studies aim to identify the significant factors that determine attitudes, especially the level of acceptance or

tolerance toward species that may pose challenges to local livelihoods and safety (Dickman, 2010; Nyhus, 2016). Often, researchers evaluate how sociodemographic factors, such as gender, age, education, occupation, religion, and wealth influence attitudes. Through segmenting human populations across sociodemographic dimensions, these studies intend to compare perspectives across specific subgroups within a human population (Fishbein & Ajzen, 2011). This knowledge of sociodemographic-partitioned attitudes can be instrumental in developing targeted conservation policies and programs tailored to different population segments. However, despite consistent findings underscoring the influence of sociodemographic variables on attitudes (e.g., Drake et al., 2019; Kellert, 1985; Kimmig et al., 2020; Teel & Manfredi, 2010), there is a notable lack of agreement on how each sociodemographic factor affect attitudes, highlighting the context-dependent nature of their effects.

This study explores the impact of sociodemographic factors on the attitudes of ethnic Tibetans in China toward three large carnivores: the snow leopard (*Panthera uncia*), gray wolf (*Canis lupus*), and brown bear (*Ursus arctos*). Ethnic Tibetans in China mainly live in the Tibet Autonomous Region (TAR) and Qinghai Province, but they also inhabit other regions of the Tibetan Plateau under the administrative jurisdictions of Sichuan, Gansu, and Yunnan provinces. The three large carnivore species are found in the pastoral landscapes of these Tibetan regions (Smith & Xie, 2013), though scientific evidence regarding the distribution and abundance of these three large carnivores remains scarce.

Across the Tibetan Plateau, incidents involving snow leopards and gray wolves preying on livestock, as well as brown bears breaking into tents and houses and causing human injuries, are fairly common (Gao, Lambert, et al., 2023; Gao, Lee, et al., 2023). These events, often categorized as “human–wildlife conflicts” by conservation practitioners, can result in significant material losses and emotional stresses for local people (Chen et al., 2016; Dai et al., 2019; Li et al., 2013). Tibetan Buddhism, a religious and philosophical belief system deeply ingrained in the local culture, is believed to play a role in the relatively high level of tolerance Tibetan herders have for these animals (Li et al., 2014).

The main objective of this study is not to extrapolate Tibetan attitudes toward the three large carnivores from a sample survey but rather to highlight and contrast sociodemographic differences. To this end, we scrutinized existing literature on Tibetan wildlife attitudes to synthesize previously examined sociodemographic factors and their implications. Due to word constraints, we detailed the methodology and results of this part of our study in Appendix S1. We crafted a Tibetan-language questionnaire grounded in this review, extensive ethnographic fieldwork, and insights from local cultural experts, and then conducted an online survey through random sampling. The data we amassed enabled us to undertake statistical analyses, probing how different sociodemographic factors impact distinct facets of attitudes (i.e., affective, behavioral, cognitive, and overall) concerning specific animals (i.e., snow leopards, gray wolves, and brown bears).

2 | METHODS

Between 2019 and 2021, the first author undertook a 30-month ethnographic participant observation with Tibetan herders and Buddhist monks in Nyanpo Yutse, located in Qinghai Province, China (Gao & Clark, 2023; Gao, Lambert, et al., 2023; Gao, Lee, et al., 2023). Nyanpo Yutse lies within the Sanjiangyuan (Three-River-Source) region of the Eastern Tibetan Plateau, an area inhabited by snow leopards, gray wolves, and brown bears, as well as other wildlife species. The fieldwork received approval from both the Institutional Review Boards of the first author's affiliated university and the Sanjiangyuan National Park Administration. As a component of the fieldwork, in May–June 2021, the first author administered an online questionnaire survey to measure Tibetan attitudes toward large carnivores. This survey was conducted in partnership with the Nyanpo Yutse Conservation Association (hereinafter referred to as “the Association”), a community-rooted non-governmental organization composed of local Tibetan Buddhist monks and herders.

The questionnaire was crafted based on the ethnographic fieldwork and insights from two Tibetan cultural experts affiliated with the Association, in addition to preliminary review of existing literature (see Appendix S1 for details). These two cultural experts, both senior Tibetan Buddhist monks, possess profound knowledge of the Tibetan language and culture. Initially, we solicited “salient beliefs” concerning the three large carnivores by engaging 12 key informants (including 8 herders and 4 monks in Nyanpo Yutse) to share their thoughts about these species. “Salient beliefs” refer to the immediate

ideas or information that surfaces when an individual thinks of a specific attitude object (Ajzen, 2001). From this exercise, we gathered a total of 65 attitude-related statements in the Tibetan language.

In collaboration with the two Tibetan cultural experts, we synthesized and grouped these statements, yielding nine general statements for further attitude assessment. With a thorough grounding in Tibetan language and culture, we developed three statements encapsulating affective attitudes (e.g., “fearsome,” “likable,” and “pitiful,” with further elaborations on the latter provided in Section 4), three capturing behavioral attitudes (e.g., “want to see,” “want to protect,” and “want numbers to increase”), and three highlighting cognitive attitudes (e.g., “harmful to people,” “harmful to livestock,” and “serious conflict”).

Subsequently, these nine statements were transformed into question form for the survey, prompting participants to express their agreement or disagreement (refer to Table 1; Appendix S3 contains the original version in Tibetan). Relying on our research experience and following consultations with local experts, we opted for a straightforward three-point scale (comprising options: yes, do not know, and no) instead of the popular five-point Likert scale. This decision was taken to avoid potential misinterpretations by Tibetan respondents, who might be unfamiliar with survey questionnaires or find it challenging to discern and quantify subtle attitudes.

Concerning the background details of our survey participants, we included eight questions in the questionnaire (Table 2; see Appendix S3 for the original Tibetan version). Of these, six pertained to sociodemographic factors, such as gender, age, level of education, religious identity, province of residence, and landscape of origin (i.e., the environment where one grew up: pastoral, semi-pastoral, agricultural, or urban). The remaining two questions asked respondents to self-assess their herding experience (categorized as none, a few years, or many years) and the frequency with which they have encountered the three large carnivores in their natural habitats rather than in zoos (categorized as never, a few times, or many times).

To ensure the reliability and relevance of our questionnaire, we followed a validation process involving both expert review and pilot testing, as suggested by Whitehouse-Tedd et al. (2021). The first author consulted with the two Tibetan experts to ensure that the wordings in the questionnaire were comprehensible to Tibetans across various regions and dialects. He thereafter conducted in-person interviews with eight responders in Nyanpo Yutse to pre-test the questionnaire.

Finally, we employed “Wen Juan Xing,” a widely used web-based survey tool in China, to disseminate our questionnaire. Rather than targeting specific sociodemographic groups or regions, we adopted a random

TABLE 1 Evaluative descriptions used for attitude assessment, the corresponding attitude scores for the three-point scale (“yes”, “do not know”, “no”), and the number of responses for each description by each carnivore species.

Component	Description ^a	Corresponding attitude score and number of responses		
		“Yes”	“Do not know”	“No”
Affective attitude	Are [target species] fearsome?	−1	0	+1
	Snow leopard	298	280	300
	Gray wolf	380	26	472
	Brown bear	771	56	50
	Are [target species] likable?	+1	0	−1
	Snow leopard	414	269	194
	Gray wolf	247	75	556
	Brown bear	176	104	597
	Are [target species] pitiful?	+1	0	−1
	Snow leopard	300	326	249
	Gray wolf	560	142	174
	Brown bear	464	247	165
Behavioral attitude	Do you want to see [target species]?	+1	0	−1
	Snow leopard	622	105	150
	Gray wolf	352	68	458
	Brown bear	300	80	496
	Do [target species] need to be protected?	+1	0	−1
	Snow leopard	671	157	49
	Gray wolf	478	186	213
	Brown bear	484	191	202
	Do you want [target species] numbers to increase?	+1	0	−1
	Snow leopard	454	125	298
	Gray wolf	191	109	577
	Brown bear	196	108	573
Cognitive attitude	Are [target species] harmful to people?	−1	0	+1
	Snow leopard	134	375	368
	Gray wolf	270	95	511
	Brown bear	696	87	93
	Are [target species] harmful to livestock?	−1	0	+1
	Snow leopard	318	327	232
	Gray wolf	761	31	85
	Brown bear	333	228	316
	Are conflicts between [target species] and people serious?	−1	0	+1
	Snow leopard	120	332	425
	Gray wolf	366	132	379
	Brown bear	485	178	214

Note: The attitude score represents the response's relative direction (positive, neutral, and negative) in predicting attitude. Scores for negatively-worded attitude statements were reversed to match the scale scoring of positively-worded attitude statements. For example, if a respondent answered “yes” to the question, “is snow leopard likable?” the attitude score is +1 (positive); if a respondent answered “yes” to the question that “is snow leopard fearsome?” the attitude score is −1 (negative).

^aThese descriptions were translated from Tibetan into English. The original Tibetan version can be found in Appendix S3.

sampling approach. The survey was widely shared via personal WeChat accounts and the Association's social media channels from May to June 2021. This approach allowed us to gather responses from a diverse range of Tibetan respondents for rigor comparison. We are aware of the limitations associated with online surveys and will delve into this issue in Section 4.

To facilitate statistical analysis, we assigned a score for each response to the evaluative questions: +1 for 'yes', 0 for 'do not know', and -1 for 'no'. These scores denote the relative direction of the response in shaping the attitude, whether it is positive, neutral, or negative. Scores for negatively-worded attitude statements were inverted to align with the scoring scheme of positively-worded statements (refer to Table 1). For example, if a respondent answered "yes" to the question, "Is snow leopard likable?" the attitude score would be +1, representing a positive attitude. Conversely, if a respondent answered "yes" to the question, "Is snow leopard fearsome?" the attitude score would be -1, indicating a negative attitude. We then aggregated the individual scores for each statement to generate composite scores for overall attitudes, which range from -9 to 9. Similarly, we calculated composite scores for the affective, behavioral, and cognitive components, each ranging from -3 to 3. This process converted the categorical responses into quantitative variables suitable for statistical analysis.

We reported the average attitude scores delineated by species and background factors. First, we applied the Chi-square test for independence to assess whether there were statistically significant associations between background factors and responses to each evaluative statement. Second, we employed *t*-tests (for two groups) or analysis of variance (ANOVA) and Tukey's HSD post hoc tests (for three or more groups) to compare attitude scores across species. This allowed us to analyze whether there were significant sociodemographic differences in affective, behavioral, cognitive, and overall attitudes toward different species.

Third, we fitted generalized linear models to identify variables significantly influencing the overall, affective, behavioral, and cognitive attitudes. We used backward stepwise regression and the Akaike information criterion to select the most parsimonious model (i.e., the model with the lowest number of explanatory variables). It should be noted that the limitations associated with stepwise regression analysis have been well-documented (Whittingham et al., 2006). Instead of trying to discern the significant effect of many variables, our goal was to assess the relative effects of a selected group of candidate predictors chosen based on our review of studies about sociodemographic

influences on attitudes. We executed all analyses using R (v.4.1.1). All statistical tests were two-sided, with a level of significance of .05.

3 | RESULTS

3.1 | Background of respondents

Our survey garnered 879 valid responses. Table 2 presents the sociodemographic profile of these respondents. The majority of respondents were male (92.1%, $n = 810$) and aged between 19 and 30 years (57.9%, $n = 509$). Most were from Qinghai (59.8%, $n = 526$) and grew up in pastoral areas (73.6%, $n = 647$). Over half identified themselves as laypersons (57.5%, $n = 505$), while the remaining (42.6%, $n = 374$) were monks or nuns (in other words, monastic) at the time of the study. Nearly a third (33.0%, $n = 290$) had received higher education (i.e., college or above), and another (32.1%, $n = 282$) had undertaken studies in Buddhist monasteries.

A significant portion of respondents had herding experience: 50.1% ($n = 440$) reported a few years of experience, while 32.8% ($n = 288$) had many years of experience. Of those without herding experience ($n = 151$), 66.9% were monks or nuns. Encounters with gray wolves were common, with 94.8% ($n = 833$) of respondents having seen them; of these, 68.5% ($n = 602$) reported frequent encounters. In contrast, most respondents had never seen snow leopards (74.0%, $n = 647$) or brown bears (72.5%, $n = 637$). Only a small number indicated frequent encounters with snow leopards (6.9%, $n = 61$) and brown bears (6.9%, $n = 61$). A distinct group of 21 respondents (2.4%) claimed they had seen all three large carnivores many times. Within this group, most were laypersons (76.2%, $n = 16$) with many years of herding experience (76.2%, $n = 16$). Conversely, 41 respondents (4.7%) had never seen any of the three species—among them, 63.4% ($n = 26$) were monastic, and 48.8% ($n = 20$) lacked herding experience.

3.2 | Attitudes toward the three species

The mean score of attitudes toward the three carnivores for each attitudinal statement varied across the three large carnivores (Figure 1). Most respondents agreed that snow leopards are likable (mean (SD) = 0.3 (0.8)), that they want to see snow leopards (mean (SD) = 0.5 (0.8)), and that they desire snow leopard numbers to increase (mean (SD) = 0.2 (0.9)). Most respondents agreed that brown bears are fearsome (mean (SD) = -0.8

TABLE 2 Summary of socio-demographic profile and personal experience of the respondents.

Variable	Percentages recorded (count)
Gender	
Male	92.1% (810)
Female	7.9% (69)
Age (years)	
1–18	5.8% (51)
19–30	57.9% (509)
31–55	34.7% (305)
>55	1.6% (14)
Level of education ^a	
Primary	18.2% (160)
Secondary	7.1% (62)
Higher	33.0% (290)
Monastic	32.1% (282)
None	9.7% (85)
Religious identity	
Lay	57.5% (505)
Monastic	42.6% (374)
Landscape of origin ^b	
Pastoral	73.6% (647)
Semi-pastoral	13.0% (114)
Agricultural	9.1% (80)
Urban	4.3% (38)
Province of residence	
Qinghai	59.8% (526)
Sichuan	21.1% (185)
Tibetan Autonomous Region	9.7% (85)
Gansu	9.0% (79)
Others	0.5% (4)
Herding experience	
A few years	50.1% (440)
Many years	32.8% (288)
None	17.2% (151)
Snow leopard encounter frequency	
Many times	6.9% (61)
A few times	19.5% (171)
Never	74.7% (647)
Gray wolf encounter frequency	
Many times	68.6% (602)
A few times	26.3% (231)
Never	5.2% (46)
Brown bear encounter frequency	
Many times	6.9% (61)

(Continues)

TABLE 2 (Continued)

Variable	Percentages recorded (count)
A few times	20.6% (181)
Never	72.5% (637)

^aPrimary education includes elementary and middle schools.^bLandscape of origin refers to the environment where one grew up.

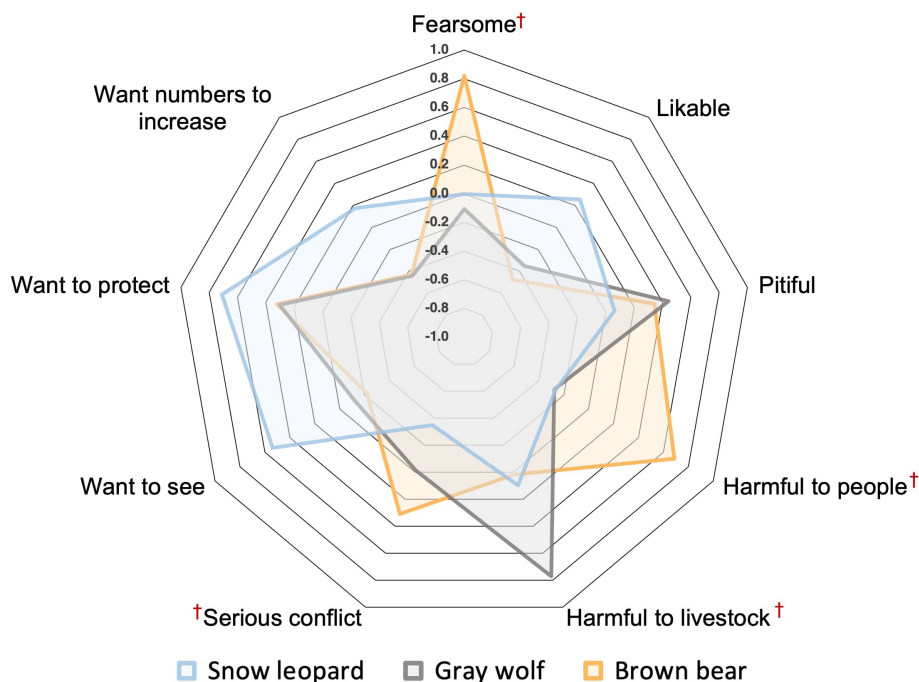
(0.5)), harmful to people (mean (SD) = -0.7 (0.7)), and in serious conflict with people (mean (SD) = -0.3 (0.8)). Gray wolves were perceived to be the most harmful to livestock (mean (SD) = -0.8 (0.6)). Respondents generally agreed that all three carnivores are pitiful (snow leopard: mean (SD) = 0.1 (0.8), gray wolf: mean (SD) = 0.4 (0.8), and brown bear: mean (SD) = 0.3 (0.8)) and in need of protection (snow leopard: mean (SD) = 0.7 (0.6), gray wolf: mean (SD) = 0.3 (0.8), and brown bear: mean (SD) = 0.3 (0.8)). Nevertheless, most respondents did not want to see an increase in the number of gray wolves (mean (SD) = -0.4 (0.8)) or brown bears (mean (SD) = -0.4 (0.8)).

One-way ANOVA analysis indicated significant differences in mean scores for overall attitudes between at least two of the three species (refer to Figure 2 and detailed statistical results in Appendix S4). Turkey's HSD tests showed that overall attitudes toward snow leopards were significantly more positive compared to attitudes toward both brown bears and gray wolves. Meanwhile, overall attitudes toward brown bears were significantly more negative than those toward gray wolves. Significant variations were also observed in the affective, behavioral, and cognitive components of attitudes for each species (as shown in Figure 2). In terms of affective attitudes, respondents held significantly more negative attitudes toward brown bears compared to snow leopards and gray wolves. Behavioral attitudes toward snow leopards were significantly more positive than those toward gray wolves and brown bears. As for cognitive attitudes, those toward snow leopards were significantly more positive compared to gray wolves and brown bears. In addition, cognitive attitudes toward brown bears were significantly more negative than those toward gray wolves.

3.3 | Effect of sociodemographic factors

Our Chi-square tests of independence produced extensive data concerning the association between sociodemographic factors and responses to individual attitude statements. Here, we focus on the variables of gender (male or female)

FIGURE 1 Mean attitude scores for each evaluative statement for snow leopards, gray wolves, and brown bears. Attitude scores for statements associated with negative attitudes (†) are inverted (from +1 to -1) for a more straightforward interpretation. The further a data point is from the center, the more the respondents agree with the corresponding statement.



and religious identity (lay or monastic) as examples, with comprehensive results available in Appendix S5.

Associations between gender and responses to certain attitude statements about snow leopards were found to be significant. Specifically, these statements pertained to whether snow leopards are seen as likeable, pitiful, in serious conflict with humans, respondents' interest in seeing them, and the desire for an increase in their numbers. Women tended to view snow leopards as pitiful ($p = .048$) and as causing significant conflict with people ($p = .031$). On the other hand, men found snow leopards more likable ($p < .001$) and were more likely to express hopes for an increase in their numbers ($p = .010$). When it came to the desire to see snow leopards, women showed a more neutral stance ($p = .033$). Notably, no gender differences were detected regarding perceptions of snow leopards as fearsome, as threats to humans or livestock, or in the wish to protect them. For gray wolves, gender was significantly linked with perceptions of them as fearsome; women found wolves more fearsome ($p = .034$) than men did. However, gender did not influence other attitude statements related to gray wolves. Lastly, regarding brown bears, there were no significant associations between gender and any of the attitude statements.

There were also significant associations between religious identity and responses to certain statements about snow leopards, namely: their fearsomeness, likability, pitifulness, harmfulness to humans and livestock, as well as the respondents' inclination to protect them, and their desire to see an increase in their numbers. However, no such association was identified concerning the desire to

see snow leopards or the belief that they are in serious conflict with humans. In the case of gray wolves, religious identity significantly correlated with perceptions of their pitifulness, harmfulness to livestock, their conflict level with humans, and the inclination to protect them or increase their population. With brown bears, the religious association was only significant in the perceptions of their pitifulness and the wish to see their numbers rise.

Compared to laypersons, monks and nuns were more inclined to perceive the three carnivore species as pitiful (snow leopard: $p < .001$; gray wolf: $p < .001$; and brown bear: $p < .001$). Furthermore, they were less likely to see wolves as seriously conflicting with humans ($p < .001$). On the other side, laypersons were more prone to find snow leopards likable ($p = .028$) and less likely to view them as harmful to people ($p = .004$) or livestock ($p = .007$). Furthermore, laypersons expressed stronger attitudes about their inclination to protect snow leopards ($p = .022$) and wolves ($p = .002$), and their hope to see a rise in the populations of the three species (snow leopard: $p = .001$, gray wolf: $p < .001$, and brown bear: $p < .001$). They also had more intense beliefs about the fearsomeness of snow leopards ($p < .001$) and the potential threats wolves pose to livestock ($p = .009$).

Furthermore, our analysis revealed significant socio-demographic differences in relation to different attitude components for different species (for detailed results, refer to Appendix S6). First, consider the effect of a particular sociodemographic factor on different components of attitudes directed at the same species. Our results, for instance, illustrated that gender wielded a significant

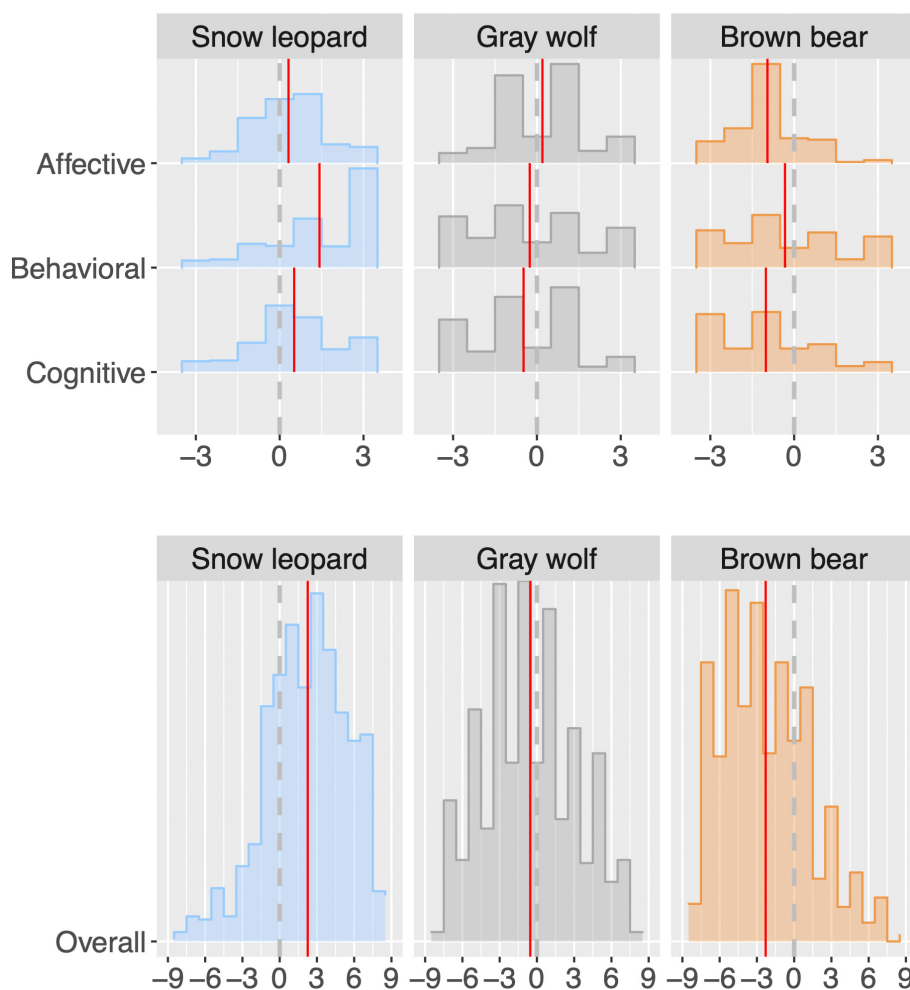


FIGURE 2 Ridge density histograms of affective, behavioral, cognitive, and overall attitude scores for snow leopards, gray wolves, and brown bears. All score differences were significant between species within each category except between gray wolves and snow leopards in affective attitudes and between gray wolves and brown bears in cognitive attitudes. The red lines indicate mean attitude scores.

effect on the affective and overall attitudes toward snow leopards; in both dimensions, males were more positive than females (Figure 3a). However, when it came to behavioral and cognitive attitudes toward snow leopards, gender differences became insignificant. Another example concerns the effect of religious identity on attitudes toward brown bears (Figure 3b). In terms of affective and overall attitudes, the laypeople were significantly more negative than the monastic. Nonetheless, when it came to behavioral and cognitive sentiments, the gap between the lay and monastic groups faded into insignificance.

Second, let us examine the effect of a particular socio-demographic factor on the same attitude component across different species. Taking the influence of age on behavioral attitudes as an example (refer to Figure 4a), statistical tests showed no significant difference among age groups for both gray wolves and brown bears. However, with snow leopards, there was a significant difference between the age categories of 31–55 and 1–18 as well as between 31–55 and 19–30. Specifically, the middle-aged people (31–55) displayed more negative behavioral attitudes toward snow leopards compared to

the younger cohorts. Another case in point pertains to the effect of encounter frequency on affective attitudes (see Figure 4b). Our results revealed no significant variances in affective attitudes toward snow leopards or brown bears based on encounter frequency. However, when it came to gray wolves, a notable difference was observed in affective attitudes between those who had encountered gray wolves numerous times and those who had only a few such encounters.

3.4 | Attitude determinants

Our regression modeling uncovered the significant determinants that influenced the affective, behavioral, cognitive, and overall attitudes across different species (detailed results can be found in Appendix S7). For snow leopards, the strongest predictors for overall attitudes were gender, age, and encounter experience, as suggested by the best model ($R^2 = 0.035$, $F(6, 872) = 5.254$, $p < .001$). Women, on average, exhibited less favorable views toward snow leopards compared to men. The age

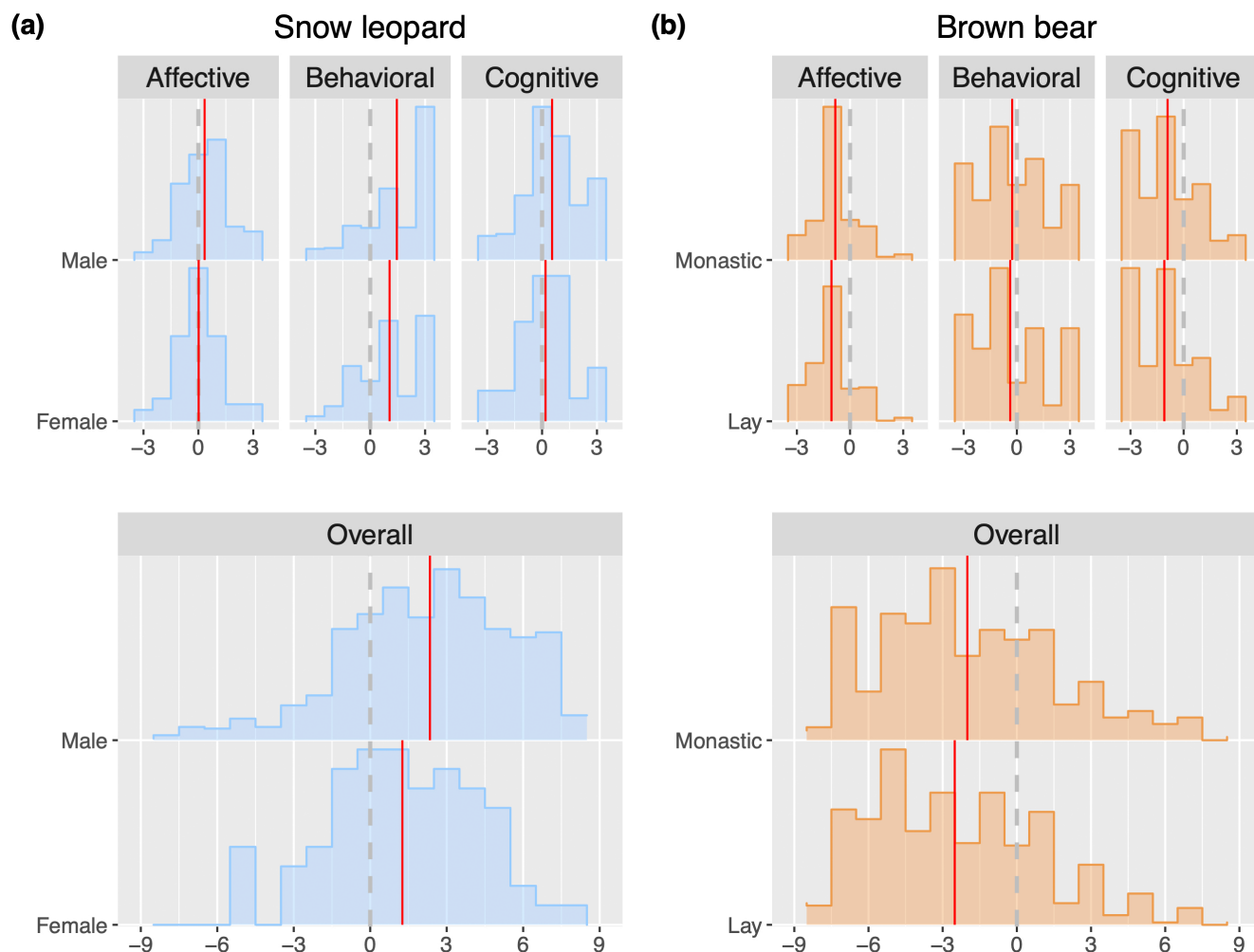


FIGURE 3 Ridge density histograms of affective, behavioral, cognitive, and overall attitude scores of two species to demonstrate how different components of attitude can vary across the same sociodemographic factor. (a) Snow leopards broken down by gender; and (b) brown bears broken down by religious identity. The red lines indicate mean attitude scores. Statistical tests found that gender had a significant effect on affective and overall attitudes toward snow leopards but not for behavioral and cognitive attitudes. The lay were significantly more negative than the monastic in terms of affective and overall attitudes but not for behavioral and cognitive attitudes.

bracket of 31–55 held more positive attitudes relative to their younger and older counterparts. Furthermore, individuals who had frequent encounters with snow leopards bore more positive attitudes than those with limited or no previous encounters. In terms of affective attitudes toward snow leopards, there was a negative relationship with formal education levels, whereas a positive correlation existed with herding experience ($R^2 = 0.031$, $F(9, 869) = 3.062$, $p = .001$). Notably, the 31–55 age group also demonstrated a proclivity for more positive affective attitudes in comparison to other age demographics. As for the behavioral attitudes, they were positively influenced by age, and it was observed that women held less positive attitudes in this regard than men ($R^2 = 0.021$, $F(4, 874) = 4.761$, $p < .001$). Cognitive attitudes toward snow leopards showed a significant influence from age and encounter experience ($R^2 = 0.020$,

$F(5, 873) = 3.643$, $p = .003$). Again, those within the 31–55 age range displayed a more favorable stance, especially if they had previous encounter experiences with snow leopards.

For gray wolves, the best model for overall attitudes ($R^2 = 0.012$, $F(4, 874) = 2.602$, $p = .035$) indicated that age and religious identity were significant predictors. Specifically, those under 18 held the most negative attitudes, with those above 55 following, while monastic individuals were more positive than the laypeople. In terms of affective attitudes, the best model ($R^2 = 0.031$, $F(7, 871) = 4.009$, $p < .001$) pointed to gender, age, religious identity, and encounter experience as significant predictors. Respondents under 18 were the most negative, but among those over 18, younger respondents were more positive than older ones. Men were more positive than women, and monastic individuals exhibited more favorable views than laypeople. Surprisingly, those who had a

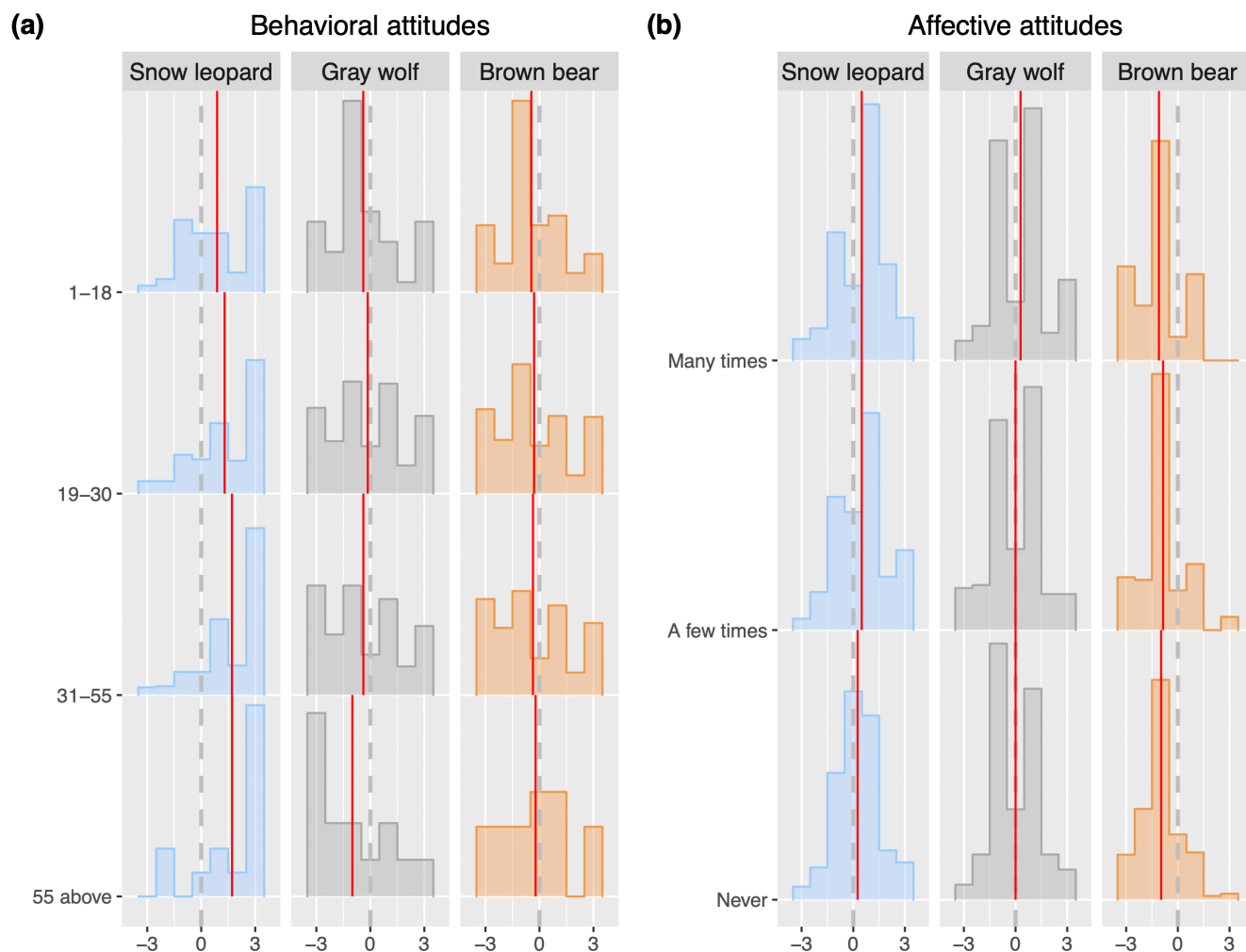


FIGURE 4 Ridge density histograms of behavioral and affective attitudes for the three large carnivores to demonstrate how the effect of the same sociodemographic factor on the same attitude component can vary across different species. (a) Behavioral attitude broken down by age; (b) affective attitude broken down by encounter frequency. The red lines indicate mean attitude scores. Statistical tests found no significant difference between any age groups for gray wolf and brown bear, but there was a significant difference between the age categories of 18–30 and 31–55 as well as between 19–30 and 31–55 for snow leopards. In addition, there was no significant difference between the frequency of encounters in affective attitudes toward snow leopards or brown bears, but there was a significant difference between occasional (a few times) and frequent (many times) encounters for gray wolves.

few encounters with wolves were more negative than those with no encounters or those who encountered wolves frequently. For cognitive attitudes, province of residence emerged as the single significant predictor in the best model ($R^2 = 0.013$, $F(4, 874) = 2.936$, $p = .020$). Respondents from TAR were significantly more positive than those from other provinces, with individuals from Gansu being the most negative. Lastly, there were no significant predictors in the best model for behavioral attitudes toward gray wolves.

For brown bears, the most predictive model for overall attitudes ($R^2 = 0.038$, $F(8, 870) = 4.263$, $p < .001$) highlighted the province of residence, encounter experience, and herding experience as crucial variables. Specifically, residents of Qinghai expressed more negative

sentiments toward brown bears compared to those from TAR, Gansu, and Sichuan. Those with herding experience also held more negative attitudes, as did individuals who had previously encountered brown bears. Turning to affective attitudes, the best model ($R^2 = 0.008$, $F(1, 877) = 6.991$, $p = .008$) identified religious identity as the sole significant predictor, with monks and nuns generally possessing more positive attitudes than laypersons. For behavioral attitudes, the optimal model ($R^2 = 0.036$, $F(10, 868) = 3.237$, $p < .001$) indicated that the level of education, herding experience, and province of residence played pivotal roles. Specifically, those with monastic or primary formal education harbored more negative attitudes than the uneducated, but individuals with secondary or higher education demonstrated the most positivity.

Once again, herding experience correlated with more negative attitude, and Qinghai residents were more negative than their counterparts in TAR, Gansu, and Sichuan. Lastly, for cognitive attitudes, the best model ($R^2 = 0.021$, $F(6, 872) = 3.159$, $p = .005$) pinpointed the province of residence and encounter experience as key predictors. Individuals from Qinghai were more negative compared to those from TAR, Gansu, and Sichuan. Furthermore, those with past encounters with brown bears usually held more negative views compared to those without encounter experience.

4 | DISCUSSION

This research examined attitudes among ethnic Tibetans in China toward three large carnivore species. Through our engagement in conservation research and practice on the Tibetan Plateau, we have noticed that many conservationists working on the Tibetan Plateau often generalize that Tibetan herders have more negative attitudes toward gray wolves and brown bears compared to snow leopards, that monks are more conservation-oriented than laypeople, and that men have a greater affinity for wildlife than women. While there may be some truth to these assumptions, they can obscure the intricate dynamics of human attitudes toward wildlife. In our study, we delved into the sociodemographic variations in different attitude components across target species. Our findings highlight the importance of contextualization when analyzing and interpreting attitudes toward wildlife.

4.1 | Tibetan attitudes toward large carnivores

Our study evaluated attitudes toward three large carnivore species known to pose potential threats to local livelihoods and personal safety (Bombieri et al., 2019; Suryawanshi et al., 2013). Each of these species has unique ecological and behavioral traits, and holds varied cultural significances, resulting in unique relationships with local people. Our findings indicated a general trend of more positive attitudes toward snow leopards compared to gray wolves and brown bears. This aligns with a prior study about the cultural images of snow leopards in Sanjiangyuan (Li et al., 2013) and other studies across the snow leopard range (Suryawanshi et al., 2013). In comparison, people held strong negative attitudes toward brown bears, a sentiment echoed in many other parts of the world (Herrero et al., 2021). This could be attributed to the fact that brown bears raid houses and injure humans, and consequently have a more profound

impact on local communities than the other two species (Dai et al., 2020).

We utilized the ABC attitude model to gain a more nuanced understanding of attitudes. Our findings suggested that affective, behavioral, and cognitive attitudes do not always align. For example, while Tibetans' behavioral and cognitive attitudes toward gray wolves were negative, their affective attitudes were positive, as depicted in Figure 2. Furthermore, our findings corroborated other studies (e.g., Ajzen, 2001; Netzer et al., 2018), suggesting that various attitude components can take on different degrees of significance depending on the attitude object in question. This point is illustrated by the patterns shown in Figure 1, where positive behavioral attitudes (i.e., "want to see" and "want to protect") greatly contributed to the overall attitudes toward snow leopards. In contrast, negative affective (i.e., "fearsome") and cognitive attitudes (i.e., "harmful to people") characterized the overall attitudes toward brown bears and, negative cognitive attitudes (i.e., "harmful to livestock") dominated the overall attitudes for gray wolves. These observations further imply that for each species there are certain characteristics or attributes that consistently play crucial roles in shaping people's attitudes.

The choice of evaluative statements can significantly influence the results of attitude assessments (Crano & Prislin, 2008). In crafting our evaluative statements, we drew heavily from our ethnographic fieldwork and collaboration with local cultural experts, ensuring that local perspectives informed our study from the start. An example that shows the value of this approach is about the statement that the three large carnivores are "pitiful." Contrary to the popular belief in many modern societies, where apex predators might be assumed to lead untroubled lives if undisturbed, the traditional Tibetan Buddhist view holds that the existence of these large carnivores is miserable. Rooted in the belief that accruing bad karma through killing condemns these animals to endless suffering in the cycle of rebirth, many Tibetans express pity for these creatures. Without deep engagement with the local society and culture, we would not have been able to come up with this attitude evaluate statement. Thus, our approach prioritizes validity (accuracy of measures) over reliability (consistency of measures). A Cronbach's alpha analysis reveals that the consistency among the three attitude-related statements for each attitude component and each animal is relatively low, with all standardized alphas below 0.7. This highlights the difficulty of finding "reliable" attitude measures and emphasizes our contention that attitudes are not unidimensional but highly contingent upon the evaluative statements chosen for attitude assessments.

4.2 | Contextualization of sociodemographic differences

Numerous studies indicate that people's attitudes toward carnivores are shaped by a wide range of factors, including, but not limited to, social, cultural, and economic circumstances, as well as personal values and predispositions (Bruskotter & Wilson, 2014; Dickman, 2010; Gao & Clark, 2023). Both our literature review and questionnaire survey highlight that Tibetan attitudes toward snow leopards, gray wolves, and brown bears are associated with diverse sociodemographic factors. Yet, the observed patterns of sociodemographic differences are complex and vary depending on the specific context. Consequently, it is challenging to compare findings between studies—for example, our study with the reviewed literature—due to differences in sample distribution, the specific species studied, and the attitude components being examined. Our study underscores the importance of clearly delineating both the attitude objects (attitude toward what) and attitude components (what type of attitude) when investigating attitudes.

Certainly, while detailing sociodemographic differences is of value, examining the underlying reasons for these differences is even more critical. Variability in attitudes based on sociodemographic factors is unsurprising, as distinct groups often have disparate past experiences that influence their perspectives (Fishbein & Ajzen, 2011). To illustrate, within Tibetan society, the experiences of a monk starkly differ from those of a layperson. Though most Tibetans, irrespective of their residence in homes or monasteries, are followers of Tibetan Buddhism, the depth of their faith and religious practices can vary considerably between the laity and the monastic community. It should also be noted that not all Tibetan monks and nuns stay in monasteries, adding another layer of complexities as to their life experiences. In the same vein, individuals across different genders, age groups, educational backgrounds, and places of origin possess unique experiences. These experiences are deeply influenced by their individual life paths and the complex “natural–social–cultural nexus” they navigate in specific time and space (Gao & Clark, 2023). Such life experiences mold their personal identities, demands, and expectations, leading to varied attitudes toward large carnivores and other entities or events (Clark, 2011).

Indeed, the influences of distinct sociodemographic factors on attitudes are multifaceted, often interacting in intricate ways. For example, monks and nuns tend to receive monastic education, while older individuals are more likely to have more herding experiences and more frequent encounters with wildlife. These inherent correlations might partly explain why only a select few factors emerged as significant predictors in our regression models.

The relatively low coefficients of determination (all under 0.04) in the models we chose through stepwise regression further hint at the extensive variance in attitudes, which was not entirely accounted for by the factors incorporated into our models. This reinforces the idea that attitudes are a multifarious construct. To truly grasp the relationship between sociodemographic factors and attitudes, it is essential to consider how certain sociodemographic profiles position an individual within the broader social process, thereby exposing them to varied experiences (Clark, 2021; Fishbein & Ajzen, 2011). A comprehensive dive into this relationship, however, goes beyond the scope of the present study and will be addressed in detail when paired with our anthropological ethnographic findings.

Beyond sociodemographic considerations, our study examined the impacts of herding experience and wildlife encounters on attitudes. Out of the 12 models we fitted, seven included either one or both of the two factors. It is likely that the more firsthand experience one has with herding and large carnivore encounters, the more aligned their perception of the species becomes with real-world situations. Emotions such as fear, which underpin negative affective attitudes, often stem from misperceptions borne out of a lack of knowledge or firsthand experience. However, in certain situations, increased herding and encounter experiences might lead to more negative attitudes, as evidenced by the attitudes toward brown bears. Recognizing the experiences—or their absence—that influence positive or negative attitudes can be invaluable for devising effective conservation interventions.

Another potential cause of the observed sociodemographic differences has to do with social desirability. Our results showed that monks did not always hold more positive attitudes toward wildlife than laypersons. For example, Chi-square tests showed that in comparison to monks, laypersons tend to be more likely to consider snow leopards likable and less likely to consider snow leopards harmful to people and livestock. Likewise, when considering behavioral attitudes toward gray wolves, those with higher education are more likely to support wolf protection than those with monastery education. While this may be attributed to misperception due to a lack of experience, social desirability probably also plays a significant role (Krumpal, 2013). Given that college students are often more exposed to information about governmental conservation policies, they might be more inclined to conform to social expectations regarding acceptable responses.

Apart from attitude components and attitude objects, another critical consideration for contextualizing sociodemographic differences is the attitude circumstance (i.e., attitude under what situation). In our survey, responders were asked to react to a mental representation of an attitude object (e.g., a wolf). This can be very

different from responding to a real, tangible attitude object. Although our survey did not account for attitude circumstance, our ethnographic observations found that local attitudes toward large carnivores often hinge on the specific scenarios of human–wildlife interactions. Take the ambivalent attitudes toward gray wolves as an example. Generally, Tibetans expressed a dislike for wolves because wolves cause serious harm to livestock, and because of this, many do not want to see wolves and do not desire an increase in wolf numbers. However, in certain situations, such as spotting a wolf on the road, the encounter can be pleasant and even regarded as an omen of good luck. Hence, attitudes toward wolves are not merely formed by retrieving summary evaluations from memory of knowledge and past experiences (Lord & Lepper, 1999); they also involve spontaneous judgment constructed in specific moments and settings (Albarracín et al., 2005). Attitudes are therefore highly contextual, as they are influenced by many ecological, social, and cultural factors. Additionally, as contexts evolve over time and across space, attitudes might vary accordingly.

4.3 | Limitations of online surveys

While we do not purport to generalize the attitudes of the entire Tibetan population based on our sample, we acknowledge the profound impact of our sampling frame on the observed sociodemographic differences. Online surveys, although advantageous in terms of reach and efficiency, inherently bear certain limitations (Evans & Mathur, 2005; Sue & Ritter, 2012). For instance, such surveys are more likely to capture respondents with internet access and those with intense feelings regarding the research subject, thus potentially introducing a sampling bias. The lack of immediate clarification can lead to question misinterpretation, and anonymity might foster untruthful answers. Our sample size ($n = 879$), though considerable compared to prior research, possibly has an overrepresentation of literate males adept with smartphones and social media. Furthermore, the method of disseminating our survey—primarily through a conservation NGO's social network—might have drawn respondents more amenable to wildlife conservation. Consequently, our sample does not mirror the entire Tibetan demographic. Relying on a rapid online survey also limits our ability to account for other potential determinants of attitudes, such as livestock holding (Li et al., 2015), household income (Sullivan et al., 2018), and personal experiences with human–wildlife conflict (Liu et al., 2011). Nevertheless, our sizable sample still offers valuable insight into the intricate dynamics of sociodemographic influences on attitudes. In future research, we will complement our results

from this online survey with more qualitative data gathered from our extensive ethnographic fieldwork, to further validate our findings and deepen our understanding of the contextual nature of attitudes.

4.4 | Conclusions and recommendations

This study demonstrates that the influence of sociodemographic factors on Tibetan attitudes toward large carnivores are extremely complex. It hinges on the specific attitude component (what type of attitude) and object (attitude toward what), as well as the circumstances (attitude in which situation) in question. Therefore, broad generalizations about sociodemographic differences can be misleading. While this observation may seem self-evident, to our knowledge, there is a notable tendency of overgeneralization among conservation researchers and practitioners working on the Tibetan Plateau and in other regions. This underlines the need to promote greater awareness of contextualization in attitude studies. The contextual nature of attitudes necessitates an interdisciplinary and innovative approach to data collection, analysis, and interpretation (Clark, 2011). We recommend incorporating ethnographic methods in attitude studies. Ethnographic fieldwork allows researchers to gain an in-depth understanding of local attitudes beyond what snapshot research methods such as questionnaire surveys or one-time interviews can reveal. Partnering with local experts who are well-versed in the intricacies of the local society and culture can also greatly enrich our comprehension of local perspectives. A more comprehensive and contextual understanding of local attitudes can facilitate the formulation of effective conservation strategies that are attuned to local sociocultural nuances.

AUTHOR CONTRIBUTIONS

Yufang Gao was responsible for conceptualization, data collection, data analysis and interpretation, and paper writing. **Yiqing Wang, Andy T. L. Lee, Yuntian Liu,** and **Kaggie Orrick** contributed to data analysis and interpretation. **Ju Tashi Sangpo** participated in data collection and result interpretation. **Yu Luo, Justine Shanti Alexander,** and **Susan G. Clark** contributed to data interpretation, paper writing and revision. All authors read the manuscript, provided comments and suggestions, and approved the final version.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author for research purposes only. The data are not publicly available due to ethical considerations.

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SUPPORTING INFORMATION

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