



Turkish and German university students' emotions and protection intentions regarding wolves and wild boars

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Abstract

Emotional responses to wildlife can guide human responses to wildlife conflicts. At the same time, responses to wildlife often relate to cultural contexts. In this study, emotions associated with wolves and wild boars were examined in two samples taken from Turkish (N = 637) and German (N = 415) university students. As expected, different patterns of emotional responses emerged in the two samples. For example, while negative emotions such as disgust and anger toward the wild boar were prevalent in the Turkish sample, positive emotions such as joy, surprise, and interest occurred in the German sample. Significant differences between the emotions associated with wolves and wild boars were revealed in both samples. In the Turkish sample, wolves caused stronger fear, joy, and interest, whereas wild boars caused stronger anger and disgust. In the German sample, wolves caused stronger joy, surprise, interest, and sadness, whereas wild boars caused stronger disgust. Fear, however, was expressed toward both wolves and wild boars in both samples. The predictive power of emotions on students' intentions to protect wild boars and wolves was examined as well as intentions to protect human interests against these animals. Disgust was the strongest (negative) predictor of a protection intention toward the wild boar in the Turkish sample. In the German sample, joy and interest were the emotions that best predicted conservation intentions (positive) for both animals.

Keywords Emotions · Wolves · Wild boars · Wildlife protection intentions · University students

Introduction

Similar to cognitions, emotions are mental events (Jacobs et al. 2012). Emotions and cognitions are processed by separate but interacting systems in the brain (LeDoux 2000). Emotions surface as a response to a stimulus, which can be physiological (e.g., increase in adrenaline in the blood), expressive (e.g., smiling), experiential (e.g., feeling sad), and behavioral (e.g., flight) (Izard 2007; Kleinginna and Kleinginna 1981). A few emotions, such as joy, fear, sadness, disgust, and anger, are classified as “basic emotions” that are innate and universal (Ekman 1999; Izard 2011). These emotions are assumed to be inherited due to

their evolutionary function to adapt to environmental conditions (Izard 2007). For example, fear includes responses that facilitate escape or protection from threats such as predators. Emotions also have the function of evaluating objects or events (Frijda 1986), thus serving as heuristics for decisions (Wieczorek Hudenko 2012). During cognitive development in infancy, basic emotions form the basis of “emotion schemas” that include cognitions such as concepts, thoughts, and memories. Unlike basic emotions, emotional schemas can vary widely between individuals and cultures (Izard 2007, 2011). The concept of emotions includes both basic emotions and emotion schemas (Izard 2007). For example, in addition to the feeling of disgust, which is common to all humans, many different disgust schemas can occur.

Emotions can be categorized in several ways. For example, the term “discrete emotions” refers to emotions that differ in their triggers and responses (Ekman 1999). As emotions influence people's judgments and decision-making (LeDoux 1996; Lerner et al. 2015), they also play an important role in responses toward wildlife (Castillo-Huitrón et al. 2020; Wieczorek Hudenko 2012; Jacobs 2012; Jacobs and Vaske 2019; Manfredó 2008).

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Due to their respectively constitutive nature, considering emotions in wildlife conservation is increasingly emphasized (Batavia et al. 2021; Castillo-Huitrón et al. 2020; Nelson et al. 2016).

In many studies, fear has been the most frequently identified emotion related to wildlife (Arrindell 2000; Davey 1994; Flykt et al. 2013; Johansson and Karlsson 2011; Öhman and Mineka 2001; Webb and Davey 1992). In particular, fear of large carnivores is fairly common (Ambarlı 2016; Bisi et al. 2007; Dheer et al. 2021; Mohammadi et al. 2021; Oražem and Tomažič 2018; Oražem et al. 2019; Oražem et al. 2021; Randler et al. 2020; Røskoft et al. 2003). These findings have been shown to be consistent across cultures (Arrindell 2000; Davey et al. 1998; Ware et al. 1994): As a result, large carnivores such as bears and wolves, which can be dangerous to humans, form a so-called fear-relevant or predatory category. Smaller animals, such as spiders, which evoke fear even though they are not dangerous to humans, fall into a disgust-relevant category (e.g., Davey et al. 1998). The common animal fears across cultures may have evolutionary origins. For example, fear of snakes may be an innate predisposition (Öhman and Mineka 2001). Nevertheless, the cognitive interpretation can affect the fear of animals. For example, it has been found that the fear of large carnivores such as bears and wolves is associated with the perceived dangerousness of animals and the perceived controllability over one's own behavior in encountering the animal (Johansson and Karlsson 2011). Research has also shown that not only fear but also joy (Dheer et al. 2021; Jacobs et al. 2014) as well as interest and surprise (Jacobs et al. 2014) can occur regarding large carnivores. The level of emotions toward large carnivores may also differ by wildlife species (Dheer et al. 2021).

Research has reported various results concerning the effect of emotions on the support for wildlife management strategies and conservation policies. For example, in the studies of Hermann and Menzel (2013) as well as Johansson et al. (2012), fear negatively predicted the support for protection measurements toward wolves and the return of wolves. In other studies, however, fear had only little or no impact on supporting protection (Notaro and Grilli 2022), the acceptance of the presence (Engel et al. 2016) of large carnivores, or the acceptance of management strategies for large carnivores (Dheer et al. 2021; Jacobs et al. 2014). In a study in Brazil, sorrow for the disappearance of pumas and jaguars from the region has increased the acceptance of their presence (Engel et al. 2016). In contrast, some studies have revealed that the emotion of “disgust” increased the acceptance of lethal control strategies (Dheer et al. 2021; Jacobs et al. 2014). The emotions of joy (Dheer et al. 2021; Jacobs et al. 2014) and interest (Jacobs et al. 2014) also have predicted the acceptance of various management strategies of large carnivores in former studies.

As mentioned, emotions toward wildlife can be both evolutionary and culturally acquired (Jacobs 2009; Jacobs et al. 2012). In this study, we investigate emotions associated with wolves (*Canis lupus*) and wild boars (*Sus scrofa*) in samples from Turkey and Germany. The samples vary significantly regarding cultural characteristics and geographical location. Germany is a country in central Europe, and Turkey is located in both Europe and Asia. As culture is closely related to implicit and explicit religious beliefs (Cohen 2009), the sample is even more interesting: Germany is a predominantly Christian country (Forschungsgruppe Weltanschauungen in Deutschland 2018), while Turkey is a predominantly Muslim country (Diyanet İşleri Başkanlığı 2014; Esmer 2008). We therefore have decided to include the variable of religious beliefs in our study.

The gray wolf is widespread in Turkey and has been protected by Turkish Hunting Law No. 4915 since 2003 (*Resmi Gazete* 2003). Although there is a healthy wolf population in Turkey (an estimated 6000 individuals) (Ambarlı 2019), habitat fragmentation and illegal killing threaten the species (Albayrak 2011; Ambarlı 2019; Ambarlı et al. 2016; Şekercioğlu et al. 2011). In Asian and Turkish cultures, the wolf has a rather positive symbolic meaning, representing a savior, guidance, and blessedness (Can 2014; Hunt 2008; Worringer 2016). Nevertheless, the symbolic meaning is ambiguous—the animal is also feared and sometimes called a “beast” (Can 2014).

In Germany, the gray wolf has been extinct for more than 100 years. Since the 1990s, wolves have returned to Germany because of natural migration from the East and with the support of strict conservation policies (Reinhardt et al. 2013). At the time of this research (in 2016), there were 47 packs, 15 pairs, and four single-resident wolves in Germany (Dokumentations- und Beratungsstelle des Bundes zum Thema Wolf 2017). The wolf has a predominantly negative image in European culture (e.g., in the sense of “the big bad wolf”) (Jürgens and Hackett 2017). The wild boar is a common species (Ambarlı et al. 2016) and a game animal in Turkey (Eroglu 1995) and in Europe in general (Massei et al. 2015), including Germany. The pig (or wild boar) is an animal whose meat is forbidden (haram) as food in the Qur'an (Yazır 2014) and is considered unclean in Islamic tradition (Foltz 2014; Lobban 1994).

Aim of the study

Determining how emotions toward wildlife vary across various species is important to understanding what drives people's emotions toward wildlife. Additionally, for the reasons mentioned above, both wolf and wild boar carry different symbolic meanings in Turkish and German culture. Thus, emotions towards these animals in Turkey and Germany are expected to be influenced by culture. Therefore, this

research examines students' emotional dispositions toward wolves and wild boars in Turkey and Germany. We define emotional dispositions as "traits." As opposed to "states," which are momentary emotional experiences, "traits" are conducive to an individual personality. Even if they are not active, traits are always present (Jacobs et al. 2012) and can be measured. In the presence of conflictual wildlife such as wolves, the motivation to protect both the animal and human interests against the animal can occur. In Hermann and Menzel (2013) as well as previous findings from the samples of this study (Dervişoğlu and Menzel 2024), it has been shown that these intentions can successfully be explained by the protection motivation theory (PMT) (Rogers 1983; Rogers and Prentice-Dunn 1997). The current study aims to determine the intensity and predictive power of emotional dispositions toward wildlife species in two countries. For this purpose, we formulated the following research questions:

1. Is there a significant difference between students' self-reported emotions associated with wolves and wild boars?
2. What is the predictive power of self-reported emotions toward wolves and wild boars on the intention to protect wolves and wild boars and to protect human interests against the animals?

Materials and methods

Sample and data collection

This research was conducted as a cross-sectional study using a pen-and-paper questionnaire in Turkey and Germany. We used a convenience sample of university students. The sample in Turkey ($N=637$; 453 female, 176 male, 8 unspecified) included students at state universities in four different regions in Turkey (Central Anatolia, the Aegean, East Anatolia, and the West Black Sea). The Turkish students in the study covered various academic majors: circa 26% chemistry/chemistry teaching, 21% computer teaching and instructional technologies, 18% elementary school science teaching, 10% general primary school teaching, 6% biology/biology teaching, 6% preschool teaching, 6% other, 9% unspecified. A total of 70.6% of Turkish students aimed to become teachers (5% missing). The age of the participants ranged between 18 to 36 years ($M=21.72$; $SD=2.21$; 3.5% missing).

The sample from Germany ($N=415$; 314 female, 98 male, 3 unspecified) mainly included students from a German university in Lower Saxony. Ten students were from a Catholic university in North Rhine-Westphalia. The age of the students ranged between 18 and 39 ($M=22.56$; $SD=3.32$; 0.2% missing). As usual in the German university

system, the majority of students in the German sample were simultaneously enrolled in two academic majors (circa 51% biology, 28% Christian theology, 8% physics, 13% others, 1% unspecified). The career goal of 58.8% of the students is to become a teacher (1% missing). We measured religious affiliation with the question "Do you feel that you belong to a religion?" Possible answers were "not any," "Islam," "Judaism," "Christianity," and "other." The religious affiliation of the participants in the Turkish sample showed to be 93.6% Islamic ($N=596$), 0.3% Christian ($N=2$), 0.6% other ($N=4$), and 5.3% not any ($N=34$). One participant did not answer this question. The religious affiliation of the German sample showed to be 1.7% Islamic ($N=7$), 68.9% Christian ($N=286$), 1% other ($N=4$), and 28.4% not any ($N=118$).

The Turkish survey was conducted between April and May 2016, and the German survey was administered between April and June 2016. Questionnaires were administered by the lecturers or by the researcher accompanied by the lecturer at the beginning or end of the courses. Before application, students were informed about the aim of the research.

Questionnaire

As initial information, the questionnaire contained an informative text about wolves and wild boars in Turkey (for the Turkish sample) and Germany (for the German sample). The aim was to ensure that all participants had the same level of knowledge. The text described the geographical occurrence as well as some basic facts about the nutrition and social organization of each animal. The cover page of the survey featured a neutral photograph of both animals, which means the image did not evoke positive or negative emotions. The items regarding wildlife species included the word "animal," referencing wolves and wild boars. Thus, we asked participants to evaluate each item twice regarding the wolf and the wild boar, respectively. The informative texts were followed immediately by questions about sociodemographic variables. The variables were age, gender, academic major, career goal as a teacher, childhood place, geographic region where high school was attended [only on the Turkish questionnaire], religious affiliation, achievement level in biology at school, mother's and father's education level, pet ownership in childhood and today as well as its species, membership of a nature or animal protection organization, whether the family works in agriculture, and whether membership of the family is active in hunting. In addition, respondents were asked about previous experiences with the two animals (seeing a wolf and wolf tracks in the wild, seeing a wild boar and wild boar tracks in the wild). At the end of the questionnaire, respondents were asked whether they had a fear of dogs and whether they had ever been bitten by a dog.

The questionnaire included scales measuring the emotions toward wildlife, the intentions to protect wildlife and protect human interests against wildlife, the perceived threat to human interests resulting from the presence of wildlife, coping strategies for these threats including perceived barriers to coping, negative emotions toward harmful consequences of wildlife presence, religiosity, wildlife value orientations (Manfredo et al. 2009), and also the Inclusion of Nature in Self scale (Schultz 2001) and the Portrait Value Questionnaire (PVQ-21) to measure general human values (Schwartz 2003). Only the results from the scales of the emotions toward wildlife and protection intentions are presented in this paper. The scale to measure protection intentions toward the wolf and human interests against the wolf was a part of the “Questionnaire on attitudes toward the return of large wildlife to Germany” developed by Hermann and Menzel (2013, 2015) based on the PMT, and originally published in the German language. The questionnaire was adapted to the context of the “presence of wildlife” by the authors of this paper. One of the authors of this study, who is a bilingual expert in the field of biology didactics, translated the questionnaire from German to Turkish. Next, another bilingual expert from the same field back-translated the questionnaire into German. All occurring differences were discussed and eliminated based on consensus.

We measured the intention to protect wildlife with three items representing support for the existence/protection of wildlife in the public sphere (e.g., I would support the protection / the presence of the animal in a vote). Intentions to protect human interests were measured using four items, which reflect the intention to protect people’s own interests and the interests of other people in case of threats/harms that occur due to the presence of wildlife (e.g., I would be on the

side of the humans rather than animal if I and other people have disadvantages through the animal). These items were evaluated on a five-point Likert scale (1: strongly disagree ... 5: strongly agree).

Based on Jacobs et al. (2014), we used a scale to measure seven discrete basic emotions (Izard 2007), namely joy, fear, anger, surprise, sadness, disgust, and interest, using one item for each. Participants were asked the question “Please imagine the animal. Which of the following emotions does this image evoke in you?” The scale offered 1: none, 2: somewhat, 3: strong, and 4: very strong as rating categories.

Analyses

Data were analyzed IBM-SPSS, Version 23. Missing values were replaced with the mean of relevant items (except binary variables), as they occurred less than 5% per item. In previous research, the validity of the protection intention scale was tested by confirmatory factor analysis for the wolf context. Internal consistencies of the protection intention scales were checked by calculating Cronbach’s alpha scores and item-total correlations. The reliability of all scales was acceptable in both samples and also for both animals (Table 1). We used the mean across all items of a respective scale to compute the total score of a scale. A Kolmogorov – Smirnov test showed that the variables were not normally distributed. Spearman’s rho correlation coefficients between protection intention and emotions as well as gender were calculated (Table 2). Emotions regarding wolves and wild boars were compared using a sign test, as the distribution of differences between some of them was not symmetrical. The predictive power of emotions on the protection intention was examined by regression analysis.

Table 1 Item-total correlations and Cronbach’s alpha values of all scales; German and Turkish samples

	Turkey		Germany	
	Wolf	Wild Boar	Wolf	Wild Boar
Intention to protect wildlife				
<i>I would...</i>				
collect donations for the protection of the animal	0.56	0.65	0.49	0.55
support the protection / the presence of the animal in a vote	0.64	0.71	0.55	0.60
immediately affix my signature for the protection of the animal	0.66	0.70	0.68	0.71
Cronbach’s Alpha	0.78	0.83	0.74	0.78
Intention to protect human interests				
<i>I would...</i>				
want to protect human interests from problems that the animal could cause	0.38	0.39	0.53	0.49
be on the side of the humans rather than animal if I and other people have disadvantages through the animal	0.58	0.60	0.67	0.68
rather reject the protection / the presence of animals in order to prevent restrictions for me and other people	0.42	0.42	0.62	0.60
find my own interests and those of others more important than the protection of the animal	0.56	0.49	0.65	0.62
Cronbach’s alpha	0.70	0.69	0.80	0.79

Table 2 Spearman’s rho correlation coefficients between protection intentions, emotions, and gender; German and Turkish samples

	Joy	Fear	Surprise	Anger	Disgust	Sadness	Interest	Gender
<i>Turkish Sample</i>								
								(male)
IPW	0.19***	-0.12**	-0.01	-0.20***	-0.25***	-0.16***	0.26***	-0.04
IPHI against wolves	-0.17***	0.16***	0.02	0.14***	0.16***	0.05	-0.17***	0.03
IPWB	0.15***	0.00	0.03	-0.32***	-0.35***	-0.10*	0.22***	-0.22***
IPHI against wild boars	-0.10*	0.06	-0.04	0.20***	0.23***	0.10*	-0.15***	0.06
<i>German Sample</i>								
IPW	0.49***	-0.17***	0.06	-0.13*	-0.12*	0.25***	0.48***	-0.01
IPHI against wolves	-0.38***	0.21***	-0.02	0.10	0.11*	-0.21***	-0.34***	0.00
IPWB	0.35***	0.01	0.04	-0.07	-0.16**	0.21***	0.33***	-0.08
IPHI against wild boars	-0.25***	0.06	0.02	0.11*	0.17**	-0.20***	-0.22***	0.03

IPW Intention to protect wolves, IPHI Intention to protect human interests, IPWB Intention to protect wild boars

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Gender (dummy coded) entered the regression models as a control variable, as both samples were skewed in favor of females. For each regression model, the variance inflation factor (VIF) was examined to check the multicollinearity and no multicollinearity problem was detected (All VIF values < 10).

Results

Emotions toward wildlife in the Turkish and German samples

In the Turkish sample (Fig. 1), fear was the strongest emotion associated with wolves (Mdn=3.00) and wild boars (Mdn=3.00). Joy (Mdn=1.00) was hardly associated with the wild boar. In contrast, the strongest emotions associated with wolves in the German sample (Fig. 2) were surprise (Mdn=3.00) and interest (Mdn=3.00). Anger (Mdn=1.00), disgust (Mdn=1.00), and sadness (Mdn=1.00) were the least reported emotions associated with wolves and wild boars in the German sample.

We researched how the test person’s emotions differed concerning the two animals included as a context in this study. Comparing the emotions that students reported toward wolves and wild boars in the Turkish sample, the sign test showed significant differences between the emotions of joy ($Z = -12.266, p < 0.001$), anger ($Z = -5.229, p < 0.001$), fear ($Z = -3.343, p < 0.01$), disgust ($Z = -17.300, p < 0.001$), and interest ($Z = -14.538, p < 0.001$). Regarding wolves, Turkish students felt fear ($N_{wb < w} = 180, N_{wb > w} = 121, N_{wb = w} = 336$), joy ($N_{wb < w} = 219, N_{wb > w} = 26, N_{wb = w} = 392$), and interest ($N_{wb < w} = 270, N_{wb > w} = 21, N_{wb = w} = 346$) more strongly compared to their emotions regarding wild boars. On the contrary, wild boars caused more anger ($N_{wb < w} = 79, N_{wb > w} = 161,$

$N_{wb = w} = 397$) and disgust ($N_{wb < w} = 22, N_{wb > w} = 362, N_{wb = w} = 253$) than wolves. No significant differences were found between the emotions of surprise ($Z = -0.945, p > 0.05$) and sadness ($Z = -0.683, p > 0.05$).

Regarding differing emotions toward the two animals in the German sample, the sign test showed significant differences between the emotions of joy ($Z = -11.321, p < 0.001$), surprise ($Z = -10.485, p < 0.001$), disgust ($Z = -7.575, p < 0.001$), sadness ($Z = -7.291, p < 0.001$), and interest ($Z = -13.673, p < 0.001$). More exactly, wolves caused stronger joy ($N_{wb < w} = 191, N_{wb > w} = 24, N_{wb = w} = 200$), surprise ($N_{wb < w} = 165, N_{wb > w} = 21, N_{wb = w} = 229$) and interest ($N_{wb < w} = 217, N_{wb > w} = 10, N_{wb = w} = 188$), but also sadness ($N_{wb < w} = 66, N_{wb > w} = 4, N_{wb = w} = 345$). Just like in the Turkish sample, disgust ($N_{wb < w} = 2, N_{wb > w} = 65, N_{wb = w} = 348$) was stronger regarding wild boars than that regarding wolves. No significant differences were found between the emotions of fear ($Z = -0.601, p > 0.05$) and anger (binominal distribution used, $p > 0.05$) for both animals.

Predicting intentions through emotions

The correlations between protection intentions, emotions, and gender are presented in Table 2.

The results of the regression analysis of the Turkish sample are presented in Table 3. In the Turkish sample, in the model for explaining the intention to protect wolves, disgust ($\beta = -0.16, p < 0.001$) and interest ($\beta = 0.18, p < 0.001$) were the strongest predictors among all emotions tested. Additionally, sadness ($\beta = -0.10, p < 0.05$) showed significance. The emotions of disgust ($\beta = -0.22, p < 0.001$) and anger ($\beta = -0.21, p < 0.001$) were the strongest predictors explaining the intention to protect the wild boar, whereas interest ($\beta = 0.13, p < 0.01$) proved to be significant, but to a weaker extent. Joy, fear, and surprise were not significant to explain

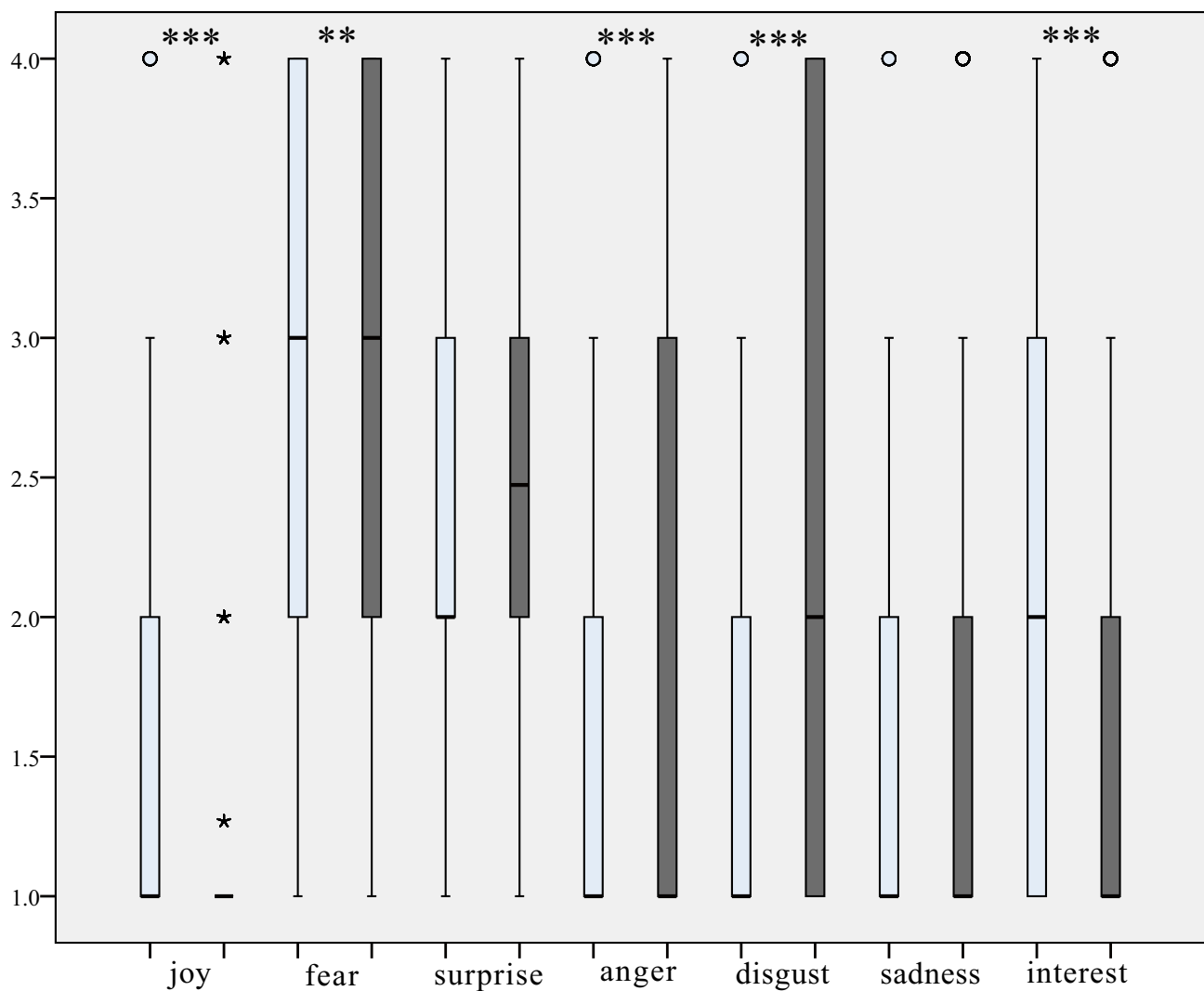


Fig. 1 Boxplots of the distribution and differences between emotions in the Turkish sample (light boxes represent emotions for wolves; dark boxes represent emotions for wild boars; **: $p < 0.01$, ***:

$p < 0.001$). The circle represents regular outliers and a single asterisk represents extreme outliers. Responses toward joy for wild boar are predominantly centered around a certain value

wildlife conservation intentions in any of the models. The explained variance of protection intentions was 13% for wolves and 22% for wild boars.

In the Turkish sample, the emotions of joy ($\beta = -0.13$, $p < 0.01$), and fear ($\beta = 0.12$, $p < 0.05$) were significant predictors to explain intentions to protect human interests against the wolf. In contrast, for the wild boar, the emotions of disgust ($\beta = 0.16$, $p < 0.01$) and interest ($\beta = -0.11$, $p < 0.05$) were significant. The emotions of surprise, anger, and sadness had no explanatory power for protection intentions toward human interests. The explained variance in this model was 6% for wolves and 8% for wild boars.

The results of the regression analyses carried out with the German sample are presented in Table 4. In the German sample, the emotions of joy ($\beta = 0.28$, $p < 0.001$ for wolves;

$\beta = 0.21$, $p < 0.001$ for wild boars) and interest ($\beta = 0.30$, $p < 0.001$ for wolves; $\beta = 0.21$, $p < 0.001$ for wild boars) were the strongest predictors in the models explaining the intentions to protect wolves and wild boars. Additionally, sadness ($\beta = 0.10$, $p < 0.05$ for wolves, $\beta = 0.12$, $p < 0.01$ for wild boars) predicted the protection intentions toward both species, and anger ($\beta = -0.10$, $p < 0.05$) served as a weak predictor of the intention to protect wolves. The emotions of surprise, fear, and disgust did not predict any of these protection intentions. The explained variance in the protection intentions toward wolves and wild boars was 32% for wolves and 17% for wild boars.

In the German sample, joy ($\beta = -0.23$, $p < 0.001$) was the strongest predictor for the intention to protect human interests against wolves and interest ($\beta = -0.18$, $p < 0.01$) and fear ($\beta = 0.12$, $p < 0.05$) were significant predictors as well. In

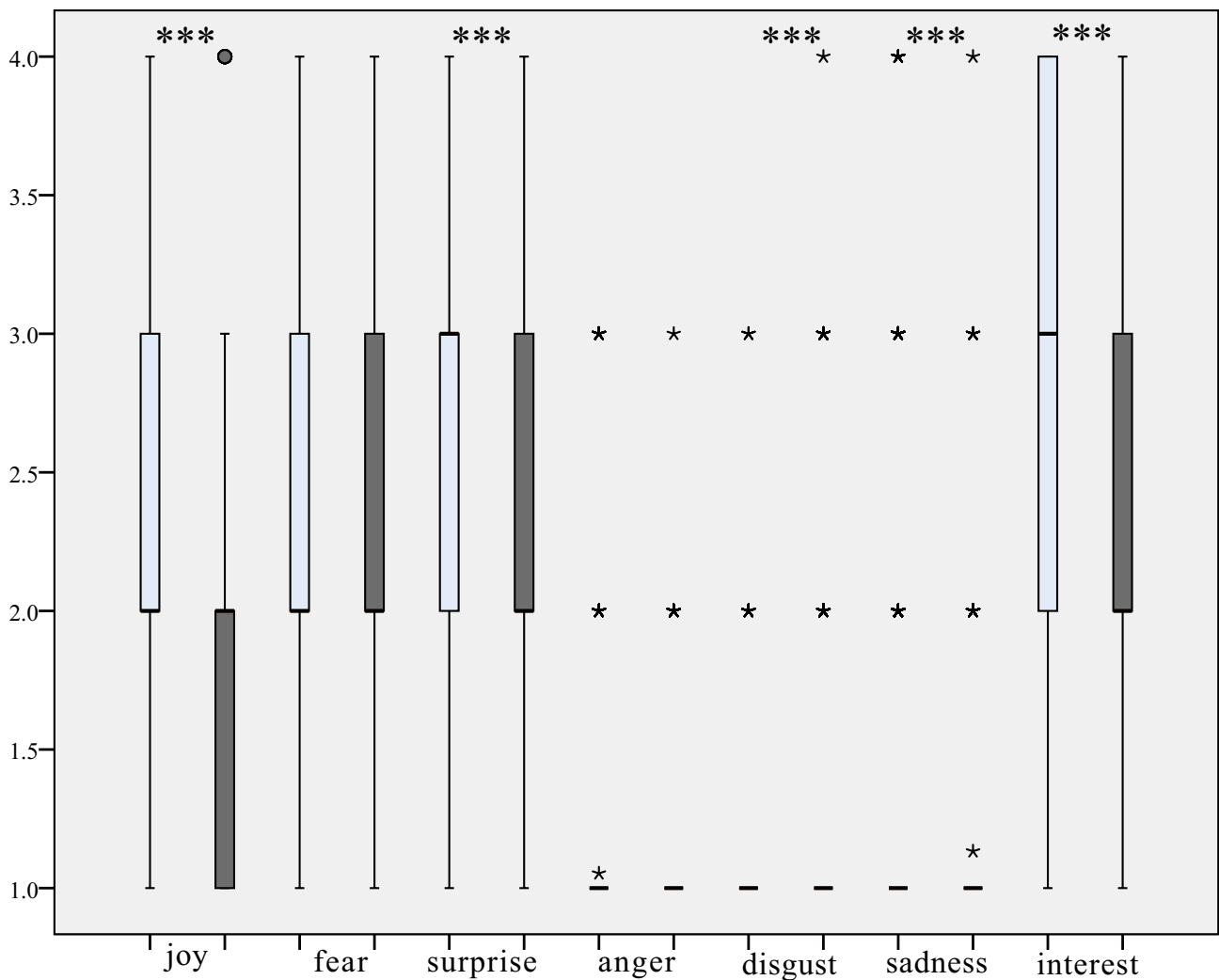


Fig. 2 Boxplots of the distribution and differences between emotions in the German sample (light boxes represent emotions for wolves; dark boxes represent emotions for wild boars; **: $p < 0.01$, ***: $p < 0.001$).

The circle represents regular outliers and a single asterisk represents extreme outliers. Responses toward anger, disgust, and sadness are predominantly centered around a certain value

the model to explain the intention to protect human interests against wild boars, interest ($\beta = -0.17, p < 0.01$) and sadness ($\beta = -0.16, p < 0.01$) were the strongest predictors, while disgust only showed a weak relationship with the dependent variable. Surprise and anger were not significant for any of the protection intentions toward human interests. The explained variance in these protection intentions was 19% for the context of wolf and 11% for the context of wild boar.

Discussion

As we were able to hypothesize from previous research, emotions showed relevance in explaining protection intentions regarding wildlife (Abidin and Jacobs 2019;

Ghasemi et al. 2021; Hermann and Menzel 2013; Johansson et al. 2012; Slagle et al. 2012; Vaske et al. 2021). Our models, however, differed from each other regarding the relative importance emotions played to explain protection intentions. More specifically, emotions played the strongest role in explaining the intention to protect wolves in the German sample. In the Turkish sample, emotions were of higher relevance for the intention to protect wild boars. Note that the participants' emotions of interest and surprise were related to wolves in the German sample, while anger, disgust, and sadness were hardly expressed for either animal.

The pattern of emotional disposition toward the wolf is similar to findings obtained by Jacobs et al. (2014) in Canadian and Dutch samples. Furthermore, in their research with

Table 3 Results of multiple regression analyses predicting the protection intentions in the Turkish sample

	IPW	IPWB	IPHI against wolves	IPHI against wild boars
Gender	-0.17***	-0.19***	0.10*	0.04
Joy	0.09	0.05	-0.13**	-0.04
Fear	-0.06	0.08	0.12*	0.04
Surprise	0.05	0.02	-0.06	-0.08
Anger	-0.03	-0.21***	0.07	0.09
Disgust	-0.16***	-0.22***	0.09	0.16**
Sadness	-0.10*	-0.02	-0.02	0.00
Interest	0.18***	0.13**	-0.08	-0.11*
corr. R^2	0.13	0.22	0.06	0.08
F value	13.039***	23.507***	6.255***	7.404***

Standardized regression coefficients (β) are presented

IPW Intention to protect wolves, IPWB Intention to protect wild boars, IPHI Intention to protect human interests

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

pre-service biology teachers, Büssing et al. (2019) found that enjoyment, in contrast to the emotions of anger and fear, predicted their desire to teach about the return of wolves in schools. In the Turkish sample, however, negative emotions such as fear, disgust, and anger were commonly expressed, while positive emotions such as joy and interest were of lesser importance. This was particularly true for the wild boar. This finding may reflect the generally negative image of the wild boar in Turkish society, which is probably shaped by the influence of the Islamic faith, as mentioned above.

Wolves and wild boars elicited fear in both samples. This finding is understandable and is in line with previous literature (Ambarlı 2016; Bisi et al. 2007; Dheer et al. 2021;

Table 4 Results of multiple regression analyses predicting protection intentions in the German sample

	IPW	IPWB	IPHI against wolves	IPHI against wild boars
Gender	-0.09*	-0.12*	0.09*	0.07
Joy	0.28***	0.21***	-0.23***	-0.10
Fear	-0.04	0.03	0.12*	0.04
Surprise	-0.05	-0.08	0.00	0.08
Anger	-0.10*	-0.06	0.07	0.07
Disgust	0.00	-0.08	0.03	0.10*
Sadness	0.10*	0.12**	-0.09	-0.16**
Interest	0.30***	0.21***	-0.18**	-0.17**
corr. R^2	0.32	0.17	0.19	0.11
F value	25.049***	11.725***	13.254***	7.215***

Standardized regression coefficients (β) are presented

IPW Intention to protect wolves, IPWB Intention to protect wild boars, IPHI Intention to protect human interests

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Jacobs et al. 2014; Mohammadi et al. 2021; Røskaft et al. 2003). Unlike the case of wolves, little previous research has examined emotions toward wild boars. An exemption is a study by Ambarlı (2016) conducted in Turkey, which found that rural students feared wild boars most when compared to wolves, brown bears, lynx, and leopards. In contrast, the most feared animal by the urban students was the wolf, followed by the wild boar in second place. Similarly, in a study with Slovenian students, Siard and Jordan (2018) found that most of the students disliked or feared wild boars. The Turkish sample of our study was mainly composed of students who grew up in the city. A similar pattern emerged as in Ambarlı's (2016) results, that is, a significant portion of the students feared the wolf more than the wild boar. Negative media coverage of wolves (Ambarlı 2019) may play a role in the greater fear of wolves in students who have no direct experience with wildlife. In the German sample, wild boars caused as much fear as wolves. Therefore, our findings indicate that wild boars are also fear-relevant animals. Perceiving large carnivores as dangerous plays a key role in the fear of them (Johansson and Karlsson 2011). Although wild boars are omnivores, they can potentially attack humans and cause acute injury (Gunduz et al. 2007).

In both samples, wolves elicited more joy and interest than wild boars. For the German sample, the recent return of wolves may explain these findings: Our test person might have regarded wolves as novel and exciting as the presence of wolves was still a relatively new phenomenon in 2016. A more recent survey showed that a large part (38.5%) of society was happy about the spread of wolves across Germany (Institut für Demoskopie Allensbach 2020). In addition, "novelty" is a criterion that plays a vital role in arousing interest in an object (Silvia 2008). It is therefore an expected finding that interest in wolves, as a new species for Germany, is greater than that of wild boars. On the other hand, the predominance of students majoring in biology in the German sample may have been effective in this finding. It is plausible that interest and joy in favor of wolves are relevant in the Turkish sample as well. Namely, under the influence of Islamic culture, wild boars might have a more negative image (Foltz 2014), whereas wolves have a more positive symbolic meaning in Turkish culture (Can 2014; Worringer 2016).

Interestingly, rather than fear or disgust as negative predictors, joy and interest as positive predictors were shown to be related to the strongest protection intentions in the German sample. Regarding the emotions of joy and interest, these findings are consistent with previous research (Ghasemi et al. 2021; Sturm et al. 2021). In the Turkish sample, however, the situation differed in that joy was not a good predictor of protection intentions. Interest is a fundamental emotion that drives learning and discovery (Hidi 2006; Silvia 2008). Thus, it is no surprise that people who are interested in wildlife are more likely to protect it. Interest related

positively to wildlife protection intentions in the Turkish sample but did not serve as a good predictor for an intention to protect human interests. In addition, our data showed that in the German sample, interest reduced the intention to protect human interests against both animals. Motivation to learn about the animal may also relate to a generally larger acceptance of the animal—even though the animal's presence would possibly demand accepting self-restrictions.

Disgust is a basic emotion (Ekman 1999) occurring as a response to avoiding unclean or infectious objects (Rozin et al. 2008). We found a common disgust disposition toward the wild boar in the Turkish sample. Haidt et al. (1997) described this type of disgust as “moral disgust.” In the Turkish sample, disgust regarding the wild boar may relate to this moral disgust. As mentioned above, in Islam, the wild boar is unclean, and it is forbidden to consume pork. In support of this, Ritter et al. (2016) have shown that the violation of religious thoughts (religiously false thoughts) may also provoke moral disgust and anger. Accordingly, we identified a moderate correlation ($\rho = 0.55$, $p < 0.001$) between the emotions of disgust and anger associated with the wild boar in the Turkish sample. Additionally, the fact that disgust and anger were stronger in the Turkish sample in the example of the wild boar also supports this claim. On the contrary, German students rarely associated wild boars with disgust. The potential for disease transmission by wild boars may play a role in causing disgust in the German sample (Meng et al. 2009).

Disgust was a stronger predictor of all wild boar-related protection intentions compared to other emotions in the Turkish sample. As mentioned, disgust was the strongest predictor of the intention to protect wild boars in Turkey, along with anger. Accordingly, the stronger the Turkish students' feelings of disgust and anger regarding the wild boar, the lower their intention to protect the animal. Interestingly, in the German sample, we found a different picture: Our data showed that the emotions of disgust and anger were not as important either in general emotional dispositions or in predicting the German test persons' protection intentions. Regarding the disgust emotion, Davey et al. (1998) have found that the number of animals that fall into the disgust-related animal category, or the intensity of emotions toward them, can differ between cultures. Moreover, research (Gogoi 2018; Mohammadi et al. 2021) has shown that cultural or religious beliefs can influence emotions toward “conflictual wildlife,” that is, species which pose a real or perceived threat to human interests, and can also lead to conflict between different human groups (IUCN SSC HWCTF 2020). Therefore, the differences may be due to cultural as well as geographic conditions or everyday life conditions. For example, since the wild boar is an animal associated with sin and filth in Islamic culture, the behavior of protecting it may symbolize a violation of religious

rules. On the other hand, in the Turkish sample, disgust was also negatively related to the intention to protect wolves. For Turkish students, 29% reported weak or strong disgust for wolves, which might reflect general dispositions toward wild animals in Turkish society. Again, this may be the effect of Islamic culture. In Islam, dogs as well may be regarded as unclean and are sometimes not welcome in the house (Berglund 2014). A negative attitude toward dogs is also seen in Islamic literature (Foltz 2014). This view of dogs may influence the view of other animals, particularly in the case of the wolf, which is similar to some dogs in its physiognomy. On the other hand, everyday life conditions in Turkey may also play a role in the perception toward wolves. For example, Turkey has a stray animal problem with dogs and cats, who potentially carry diseases and sometimes show aggressive behavior. In addition, wolves still have the potential to transmit rabies (Ambarlı 2019). Such knowledge or experience may as well shape young peoples' emotional reactions to the animals. In the German sample, different religious beliefs, the lack of stray dogs in everyday life as well as the novelty of the presence of wolves may explain the different emotional responses toward the animals that served as an example in our study.

If we examine the differences between the German and the Turkish samples, it is interesting that the emotion of sadness played a different role in the two samples. Sadness was negatively associated with protecting wildlife in the Turkish sample and positive in the German sample. This finding indicates that sadness had different connotations. While German students probably reported sadness for the animal in the face of its conservation status, Turkish students possibly reported sadness in terms of the presence of the animal. In general, sadness is an emotion associated with loss or grief (Shirai and Suzuki 2017). German students probably thought of the situation of the wolves that were once extinct in Germany (Reinhardt et al. 2013). Accordingly, in the German sample, students reported greater sadness regarding wolves than wild boars. In the Turkish sample, however, wolves are not endangered (and never were during the last centuries) and are even a common predator (Ambarlı 2019; Ambarlı et al. 2016). At the same time, human – wolf conflicts and attacks of wolves on farm animals are present in the media quite frequently (Ambarlı 2019). In addition, differing from Germany, no compensation system is available for possible damages caused by wolves in Turkey (Ambarlı 2019). In the questionnaire, items were answered separately for the wolf and the wild boar. Answering the wolf part first might have caused the emotions to be evaluated in the same way for the wild boar. As sadness reported in the Turkish sample probably related to disadvantages for humans due to the presence of the animal, no significant difference in this emotion was found in the wolf and wild boar context.

A limitation of our study is that the samples were unbalanced by academic major. Namely, students majoring in biology predominated in the German sample. Research has shown that academic majors can influence students' value orientations (Hermann et al. 2013), knowledge and attitudes (Oražem and Tomažič 2018) toward wildlife. Thus, biology (teacher) students might express more positive emotions and also report higher intentions to protect wildlife compared to the students of other programs. However, Turkey and Germany represent culturally very different samples, for example in terms of prevailing religious beliefs, and university students are at the age where they have largely internalized the culture they grew up in. Therefore, it is likely that the differences observed between samples also reflect cultural effects.

Conclusions

Our research provides preliminary work regarding emotional dispositions in the context of two wild animals in two distinct cultures. In particular, findings about disgust offer clues about the role of religious traditions in the acquisition of emotional dispositions toward animals. In addition, our findings point to an existence of a general disposition of disgust for wild animals in Turkish society. Further exploration of this issue may provide more data, particularly regarding the role of culture in emotional dispositions. For this purpose, a study with test persons from various geographical and socio-cultural backgrounds, particularly more diverse in age and educational backgrounds, would be promising.

In agreement with other studies, we also found that fear does not play a key role in conservation decisions about wolves. Therefore, a blank assumption of people not being willing to protect a species because of their emotional disposition toward the animal does not hold. This result gives us hope for wildlife conservation considering that many potentially dangerous animals are in a difficult conservation status. This dangerous status does not necessarily mean that people will not engage on behalf of animals.

More good news is that interest was one of the emotions positively foreshadowing a protection motivation toward wildlife in both samples. Interest is an emotion that we can reach through information and education. If we succeed in highlighting the importance of each threatened animal in its ecosystem and evoking curiosity in young learners toward wild living animals, they might also reflect on these animals with interest and put them in a positive place regarding their protection. Studies conducted with secondary school students showed that those who had more knowledge about large carnivores were more interested in learning about these animals (Oražem and Tomažič 2018; Oražem et al. 2019,

2021; Randler et al. 2020). In particular, student-centered teaching using realia such as skulls or fur seem to be an effective strategy for improving knowledge about these large carnivores (Oražem et al. 2019, 2021).

Joy in the German sample positively affected the protection intentions of the students, while disgust in the Turkish sample predicted protection intentions negatively. Therefore, it is more significant for wildlife conservation to focus on positive experiences with wildlife (Buijs and Jacobs 2021) in both wildlife management and education. Research indicates that knowledge about a wildlife species plays an important role in experiencing it positively (Arbieu et al. 2020). In this regard, sources of information were also important (Arbieu et al. 2019). Therefore, disseminating materials (e.g. documentaries, books, informative articles) that will facilitate access to accurate information can be an effective strategy for the protection of wildlife species. It would be beneficial to address the cultural meaning of an animal in educational measures. The religious meaning of an animal may unconsciously influence the emotional reaction toward the respective animal. Thus, it might be worth reflecting that religious food restrictions and the role of each animal in its ecosystem must be regarded separately. Once these emotional reactions can be consciously reflected, conservation behavior can be independent of an initial associated emotional reaction.

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Declarations

Conflict of interest No conflicts of interest were disclosed.

Ethics approval statement The study was conducted in accordance with the ethical standards as stated in the Declaration of Helsinki. Participants were informed about the purpose of the study, both verbally and on the cover page of the questionnaire. Participants had the option not to complete the questionnaire. Anonymity was ensured as no information about their identities was requested from the participants. Consequently, no ethical approval was required for this study.

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