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A positive presentation of wolves affects the explicit and implicit attitudes of schoolchildren towards them

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ABSTRACT

Large carnivore predators can be controversial animals, but sustainable coexistence with humans depends on peoples' tolerance and willingness to support their conservation. We conducted a short-term study on a sample of Slovak schoolchildren (aged 9–15) aimed at changing attitudes toward the grey wolf. The intervention consisted of videos and PPT presentations showing the wolf as a predator with positive characteristics crucial for ecosystem functioning (experimental group) or as a pest of farm animals with negative characters depicted in fairy tales. Participants in the experimental group showed significantly better explicit and implicit attitudes toward wolves than participants in the control group. Our research shows that a well-designed short-term intervention highlighting the importance of wolves in nature contributes to building positive attitudes toward wolves in young people.

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Attitudes toward predators; grey wolf; human-wildlife conflict

Introduction

Large carnivores, such as wolves, brown bears, wolverines and lynx can generate controversy and scepticism (Ericsson & Heberlein, 2003; Lute et al., 2020; Treves et al., 2017). People can have negative attitudes towards predators, especially if they have direct experiences with damage to private properties (Ericsson & Heberlein, 2003; Herrero et al., 2021; Kaczensky et al., 2004; Liu et al., 2011; Treves & Karanth, 2003) and if they live in a predator habitat (Bruskotter & Wilson, 2014; Dressel et al., 2015; Røskaft et al., 2007; Zimmermann et al., 2001). Furthermore, the rapid growth of the human populations and increased recreational activities are predicted to cause habitat overlap and an increase in conflict between humans and large carnivores (Baruch-Mordo et al., 2008; Bombieri et al., 2018).

Fear of predators plays a significant role in their acceptance by the public (Kaczensky et al., 2004; Prokop & Fančovičová, 2010; Wechselberger et al., 2005). Fear of predators can be readily triggered in humans due to our long evolutionary co-existence with predators (Kruuk, 2002;; Treves & Naughton-Treves, 1999 Treves & Palmqvist, 2007). Moreover, there is no need for direct experience with a predator to increase an individual's

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fear. Rachman's (1977) theory of fear acquisition proposes that fear can also be acquired through vicarious learning and information/instruction. Because observational and information learning can be used to acquire fear, it is expected to work reversely (Dadds et al., 2001; Field et al., 2001), and these strategies can be employed in educational settings. Education is expected to be a management tool to reduce fear and improve people's positive attitudes towards large carnivores (e.g. Baruch-Mordo et al., 2011; Johansson et al., 2016; Prokop et al., 2011; Treves & Karanth, 2003).

Targeted classroom experience can be a successful strategy to promote the conservation of large carnivores by modifying the attitudes and knowledge of learners to reduce human-wildlife conflict and promote sustainable coexistence (Espinosa & Jacobson, 2012; Gore et al., 2008; Pudyatmoko et al., 2018). Unfortunately, the success of educational interventions attempting to reduce human-wildlife conflict is largely mixed. Field et al. (2001) showed that negative verbal information about monsters to children aged 7–9 increased fear beliefs, supporting Rachman's (1977) theory of fear acquisition. However, positive information about monsters resulted in a slight decrease in fear of the monster, suggesting that educational interventions can be heavily limited in improving attitudes towards predators (Baruch-Mordo et al., 2011; Ericsson & Heberlein, 2003). Furthermore, traditional and university lectures combined with a workshop showed a slight but inconsistent positive influence on attitudes towards wolves in Slovenia's upper secondary school students (age ~ 16 yrs) (Oražem et al., 2019). Although knowledge about wolves consistently increased in all treatments, attitudes towards wolves remained unaffected when the traditional lecture was combined with a workshop in their school, suggesting that factual knowledge about wolves does not guarantee positive attitudes towards potentially harmful predators (Ericsson & Heberlein, 2003; Prokop et al., 2009).

We investigated the effectiveness of an educational intervention on young people's attitudes towards wolves. In this study, the wolf was chosen as a large predator because wolves were intensively hunted to near extinction in many parts of the world as they were perceived as a threat to both livestock and people (Lopez, 1978; Ripple et al., 2013). Negative attitudes have persisted to some extent even today, with many people still seeing wolves as threatening their livelihoods and safety (Ericsson & Heberlein, 2003; Randler et al., 2020; Røskaft et al., 2003). The crucial role of wolves as top predators in natural ecosystems (Hebblewhite et al., 2005; Jr et al., 2019) calls for the reestablishment of wolf populations (Williams et al., 2002), but the future of wolves depends on the willingness of humans to co-exist with them in a sustainable way (Jacobs et al., 2014; Jacobs & Vaske, 2019; van Eeden et al., 2021).

We examined how an educational intervention based on positive and neutral messages about the grey wolf (*Canis lupus*) influences explicit attitudes towards them and evaluations or judgments about them. Traditional explicit attitudes that are at the conscious level are deliberately formed (Wojnowicz et al., 2009) and can be easily investigated with self-reports. We also investigated implicit attitudes which form at the unconscious level. These are involuntarily and their investigation is based on indirect measures that are believed to provide access to these unconscious mental associations (Wojnowicz et al., 2009). It is also believed that assessing implicit attitudes is unbiased when done by standard self-reporting measures (for a review, see Gawronski et al., 2006). Furthermore, we have chosen a sample of young people because they have shown to have more positive attitudes towards wolves than older people (Dressel et al., 2015; Prokop &

Kubiatko, 2008 Randler et al., 2020; Suryawanshi et al., 2014;) and can be more readily influenced by negative information (Ericsson & Heberlein, 2003). We hypothesised that a classroom educational intervention presenting a positive message on the grey wolf, particularly its role in the functioning of ecosystems and its positive characteristics, enhances positive, explicit and implicit attitudes towards wolves. In contrast, we hypothesise that a control group receiving standard lectures depicting the wolf as a predator of farmland animals without referring to its role in the ecosystem does not influence significantly explicit or implicit attitudes towards wolves in students.

Methods

Participants

The research sample consisted of 166 respondents (77 girls and 89 boys) of the MR Štefánik Elementary School in Piešťany. Piešťany is a middle-sized town (number of inhabitants ~ 30,000) situated outside the wolf range in Western Slovakia. Students from 4th (age 9/10) to 9th grade (age 14/15) (average age was 12) were involved in the research. The sex ratio in each grade was similar.

The research was carried out in 2022. The legal representatives of participants, school management and class teachers were briefed on the aim and methods of the research. This involved the distribution of a detailed written document outlining the specific aims and purposes of the study, the methodologies employed in data collection, and an overview of the anticipated duration of the research process. Approximately 10 days before the intervention, informed consent was received from the parents. Parents were familiar with and filled out forms for processing by researchers. All classes participated in the research and all stakeholders agreed to participate.

Procedure

Participants were randomly divided into control and experimental groups. Three weeks before the experiment, participants received and filled out pre-test questionnaires using paper-and-pencil. The questionnaire consisted of demographic questions (gender, grade), drawing a picture of the grey wolf (implicit attitude), self-reported visits to the forests (How often do you go out to the forest per month? Responses varied between 0 = never and 30 = daily), words by which they could freely characterise the wolf (open question) and forms the explicit attitudes towards wolves.

Participants were shown a video and a PowerPoint presentation about wolves on the day of the intervention. Immediately after the presentation, the participants were asked to respond to the same questionnaires used in the pre-test. The questionnaires were anonymous, but we provided unique ID numbers for each participant, which allowed us to match pre-test and post-test questionnaires. This was explained to the students.

Research instruments

Explicit attitudes towards wolf

Explicit attitudes towards wolves were measured with 22 Likert-scaled items (1 = absolutely disagree, 5 = absolutely agree) developed similarly to Kellert's (1985) attitude scale

towards animals (Appendix). Prokop and Kubiatko (2008) previously used some items to examine attitudes towards wolves. Items were either formulated as positive (e.g. ' I enjoy reading about wolves or watching movies about them') or negative (e.g. 'All wolves should be poisoned') following suggestions by Likert (1932), Hausbeck et al. (1992) and Oppenheim (1993). Negative items were scored in reverse order. Cronbach alpha for the pre-test and post-test was acceptable (0.74 and 0.83, respectively). High scores mean positive and low scores mean negative attitudes towards wolves.

Implicit attitudes towards wolf

Implicit attitudes were examined by bipolar scoring the presence or absence (yes or no) of wolf teeth in participants' drawings. In addition, participants were asked to choose their drawing technique or colours freely.

Word frequency

To obtain a qualitative assessment of attitudes for each student group, we asked participants to provide a list of words that they would use to describe the wolf. This procedure was applied to the pre-test and post-test in each group of participants. The frequency of occurrence of each word per group was counted and visualised in a word frequency diagram (https://www.jasondavies.com/wordcloud/), where the size of the word text indicates the relative frequency with which the words were used. Word clouds were generated using the following visualisation parameters: rectangular spiral, −60° to +60° orientation, and scale = n. The most commonly used words with $\geq$ 5% frequency were collated for a qualitative assessment of how descriptions were mostly emotive (e.g. 'smart', 'bloodthirsty') or indicative of value or function (e.g. important [in natural ecosystems]).

Videos about wolf

The videos about the biology of the wolf were created in the OpenShot Video Editor program. We used several available documentaries and videos, which we edited and combined in the given program into short presentation of the life of wolves. The experimental group of participants watched a video highlighting the positive features of the wolf. The control group saw a video showing the negative features of the wolf from a human perspective. A detailed description of the videos is shown in Table 1. We tried to make the videos appropriate for each category of respondent and the Slovak language was used. Foreign videos were dubbed with subtitles, which younger students may have a problem with and could be distracting. Each video lasted up to 9 min.

The PPT presentation

A 10 PPT slides presentation was prepared for both the control and experimental group. The presentation described basic facts about the wolf and its behaviour. The experimental group, however, received information about the importance of wolves in ecosystems, and the control group received information about the predation of farm animals by wolves (see Table 1 for more details). The control group also received cartoon pictures of the wolf

Table 1. Description of videos and PPT presentation about a wolf concerning experimental and control group.

	Information provided	Experimental	Control
Video	Life in a pack	✓	✓
	The wolf helps reduce the overpopulation of prey	✓	–
	The wolf has well-developed instincts, it is shy, afraid of people	✓	-
	The wolf hunts weak, sick, and old individuals	✓	-
	Parental care	✓	-
	The importance of wolves in nature, given example from Yellowstone National Park*	✓	-
	Prey of wolves (wild boars, deer, unprotected flocks of sheep, rabbits)	-	✓
	Wolves cause threat to sheep	-	✓
	Hunting strategies of wolves, examples of chasing the prey (hare, deer, roe deer)	-	✓
Oral presentation	Wolf in fairy tales	-	✓
	Life in a pack	✓	
	Geographic distribution of wolves	✓	✓
	The importance of wolves in nature	✓	-
	Maintaining ecological balance	✓	-
	Hunting strategies of wolves	-	✓
	Damages caused by killing sheep and game animals to farmers and hunters	-	✓

*Smith and Stahler (2019).

character from well-known fairy tales such as Little Red Riding Hood, The Wolf and the Goat, The Three Little Pigs, and The Wolf and the Hare at the beginning of the presentation.

Statistical analyses

Explicit attitudes

The attitudes scores pre and posttest were normally distributed (Shapiro–Wilk W = 0.98 and 0.99, $P = 0.07$ and 0.78). Data were analysed with the Generalized Linear Mixed Model (GLMM), where the identities of the participants were treated as a random effect. The pre-test and post-test score was treated as a dependent variable. Treatment (experimental and control group), gender (male or female), and whether the data were collected before or after the treatment (pre-test/post-test) were fixed predictors. The self-reported frequency of visiting the forest was a continuous predictor.

Implicit attitudes

The presence of wolves' teeth in drawings (binomial dependent variable) was analysed with GLMM with the binomial distribution of data. The interaction terms between the variables were not significant, except for treatment × pre-test/post-test, and therefore were not included in GLMM. Detailed pre-test/post-test differences in the occurrence of wolf teeth between treatments were additionally analysed with the 2 × 2 Chi-square ($\chi 2$) test. All analyses were performed using SPSS ver. 26.

Results

Explicit attitudes towards wolves

Attitudes towards wolves were positive because the mean scores exceeded the average value (Figure 1). There were significant effects of treatment, pre-test / post-test, and interaction

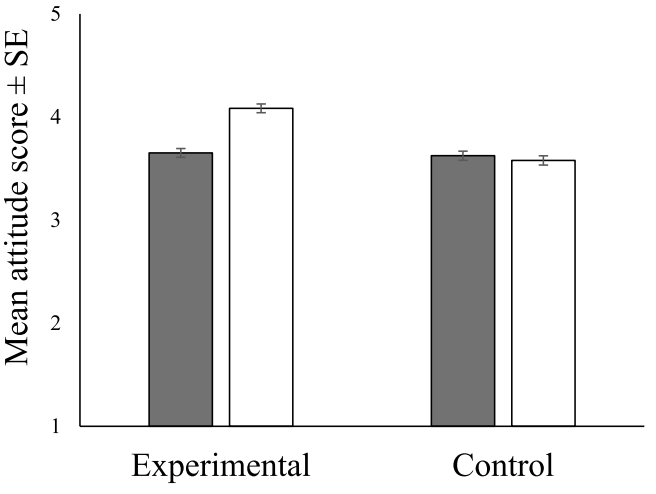

Figure 1. Differences in attitude score with respect to the effect of treatment and pre-test (grey bars) and post-test (open bars)

terms between these variables (Table 2). The pre-test scores were not significantly different from the experimental (M = 3.65, SE = 0.04) and control groups (M = 3.62, SE = 0.05) (contrast estimate = 0.03, $P = 0.66$). However, the experimental group scored significantly higher in the post-test (M = 4.09, SE = 0.04) than the control group (M = 3.58, SE = 0.05) (contrast estimate = 0.56, $P < 0.0001$, Figure 1). Males showed similar attitude scores as females (M = 3.78, SE = 0.04 and M = 3.69 SE = 0.04, respectively). Participants who reported more frequent visits to the forest showed more positive attitudes towards wolves than participants who visited the forest less frequently (Table 2).

Implicit attitudes towards wolves

Neither treatment influenced the appearance of wolves' teeth in participants' drawings, nor did the visits to the forest (Table 3). Children drew wolves with teeth (Figure 7) in the pretest significantly more frequently (72/166, 43.4%) than in the posttest (47/166, 28.3%) (Tabs 3 & 4). A significant interaction term between variables showed that there was a significant decline in the appearance of images with teeth in the experimental group in post-test drawings (Table 4). Specifically, wolf teeth occurred in 36.7% and in 49.4% of pretest drawings in the control and experimental groups, respectively (Figure 2). This difference was not significant ($\chi 2 = 2.73$, $P = 0.1$). Posttest drawings from the experimental group showed a dramatic decline in the appearance of wolf's

Table 2. Results of GLMM on attitude score.

Source	F	df1	df2	P
Corrected Model	39.741	5	326	<0.0001
Sex	2.609	1	326	0.107
Treatment	22.076	1	326	<0.0001
Visits in nature	6.865	1	326	0.009
Pretest/Posttest	63.668	1	326	<0.0001
Treatment × Pretest/Posttest	97.029	1	326	<0.0001

Table 3. Results of GLMM on the occurrence of wolf's teeth.

	F	df1	df2	*P*
Corrected Model	2.018	21	310	0.001
Sex	13.919	1	310	<0.0001
Treatment	0.692	1	310	0.406
Visits in nature	0.505	16	310	0.944
Pretest/Posttest	8.495	1	310	0.004
Attitudes	0.031	1	310	0.860
Treatment × Pretest/Posttest	12.862	1	310	<0.0001

Table 4. The occurrence of wolf's teeth concerning treatment and pretest/posttest (raw data together with percentages).

	Teeth in pre-test			Teeth in post-test		
	Absent	Present	Total	Absent	Present	Total
Control	50 (63%)	29 (37%)	79	47 (59%)	32 (41%)	79
Experimental	44 (51%)	43 (49%)	87	72 (83%)	15 (17%)	87
Total	94	72	166	119	47	166

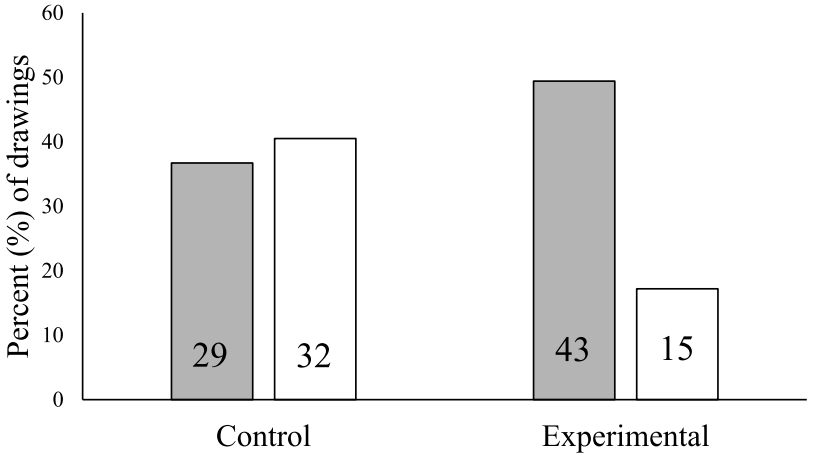

Figure 2. The occurrence of wolves' teeth with respect to treatment and pretest (grey bars) and posttest (open bars). Numbers in bars are sample sizes.

teeth (17.2%), while drawings of the control group remained almost unchanged (40.5%) ($\chi 2 = 11.04$, $P = 0.009$, Table 4).

The drawings of boys contained wolf teeth in both the pretest and post-test (53/89, 59.6% and 34/89, 38.2%, respectively) more frequently than girls (19/77, respectively 24.7% and 13/77, 16.9%, respectively, Table 2).

Word frequency

The 298 and 331 words were used to describe a wolf in the pre-test and post-test in the experimental group, respectively (Figures 3 and 4). Overall, 289 and 323 words were used to describe a wolf in the pre-test and post-test in the control group, respectively (Figures 5 and 6). These descriptions provided qualitative support for the perceived differences in the participant's attitudes towards wolves.

Figure 3. Words used by the experimental participants to describe wolf in the pre-test. The size of the word indicates the relative frequency with which that particular word was used.

Figure 4. Words used by the experimental participants to describe wolf in the post-test. The size of the word indicates the relative frequency with which that particular word was used.

Figure 5. Words used by the control participants to describe wolf in the pre-test. The size of the word indicates the relative frequency with which that particular word was used.

Figure 6. Words used by the control participants to describe wolf in the post-test. The size of the word indicates the relative frequency with which that particular word was used.

Figure 7. An example of a drawing of a wolf with teeth by the participant from the experimental group.

The words most commonly used with ≥ 5% frequency in the pre-test of the experimental group, were almost exclusively descriptive (grey [7%], fast [14%]). Some of these words could be considered emotive because they reflect fear of wolves (predator [17%]). One word (pack, 9%) revealed knowledge about the social system of wolves. None of these commonly used words reflected the ecological value of wolves. In contrast, words in the post-test reflected both positive characteristics of wolves (caring [11%], shy [5%]), their importance in ecological food webs (importance [7%]), and senses (the sense of smell [5%]). The remaining three words were similar to those of the pre-test (predator [11%], pack [9%], fast [7%]).

The most frequent words used in both the pre-test and the post-test in the control group were largely emotive (predator [15 and 17%], sharp teeth [8 and 5%]). Some words in the pre-test were purely descriptive (fast [15 and 13%], grey [8%], hairy [6%], big [6%]). In the post-test, there was an apparent increase in factual knowledge about the senses (the sense of smell [7%], [good] hearing [5%], living in groups [pack, 5%]). Only one word showed a positive characteristic of wolves (smart [5%]), but none were associated with their ecological importance.

Discussion

This study investigated the effectiveness of an intervention on attitudes towards grey wolves in a cohort of young people. The intervention consisted of an oral presentation and a video about wolves. An intervention that included visual and spoken messages

about the positive role of wolves in ecosystems produced a shift towards a more positive attitudes towards wolves. In contrast, no changes in attitudes were found if the wolf was portrayed as a pest of farm animals and if its role as the top predator in natural ecosystems was omitted.

Changing attitudes towards wolves is a challenging task because humans are generally reluctant to change their feelings and opinions towards harmful animals. Moreover, many people do not value wolves in natural ecosystems (Ericsson & Heberlein, 2003). The latter argument is held by a large number of people (about 50%) living in urban areas (Worldbank, 2019) with low contact with nature (Soga & Gaston, 2016). However, neutral attitudes towards wolves have a greater chance of being modified than negative ones (Ericsson & Heberlein, 2003). Educational interventions need to be established in a young people when ecological attitudes are developing (Kellert, 1985). Oražem et al. (2019) showed that the school talks and university workshops can reduce the fear of wolves, while the school talks only improved the conservation attitudes towards wolves. However, the school workshop group showed no improvement in attitudes towards wolves, and none of the three groups showed any change in student willingness to learn about wolves.

Workshop groups participated in a lecture about wolves, and did practical work using realia (skulls, fur, and footprints-casts), and genetic sampling techniques to estimate wolf population size and genetic relationships between and within wolf packs. They did not use video materials. Our approach was different, as we used lecture about wolves which was supported by video materials. We have identified critical information that should be integrated into successful lecture: wolves' role in natural ecosystems and their positive characters. Slagle et al. (2013) successfully increased the acceptance of brown bears in the USA by informing the participants about how to avoid bear problems and highlighting the benefits and significance of bears in nature. In summary, positive presentation of predators can contribute to developing positive attitudes towards them (Perry et al., 2022).

Participants who reported frequent visits to the forest showed significantly improved attitudes towards wolves than their counterparts who visited nature less frequently. These results corroborate the findings of Prokop et al. (2011), who showed that more frequent self-reported walking in natural areas reduced the fear of wolves in Slovak and Turkish children. Visits to nature lead to greater emotional affinity and willingness to conserve biodiversity (Soga & Gaston, 2016 Zhang et al., 2014;). Building children's positive attitudes towards wildlife through frequent nature experiences is an effective strategy for improving their acceptance of large carnivores. Direct contact with carnivores may also contribute to their acceptability (Johansson et al., 2016). However, seeing them in nature can be a challenge due to their avoidance of people (Oražem et al., 2019) or even impossible for schools in regions outside wolf territories. Zoos provide another experience to improve attitudes towards predators, but the success of such interventions is questionable. For instance, most visitors disagree with feeding predators with live vertebrate prey during exhibit (Ings et al., 1997), which suggests that people perceive predation negatively. Moreover, visitors tend to perceive animals in ZOOs as being bored and sad (Reade & Waran, 1996).

Explicit attitudes have been widely investigated, but we have examined implicit attitudes towards wolves that operate outside our conscious awareness using student

drawings. Unconscious mental associations are difficult to assess with self-report measures (for further discussion, see Gawronski et al., 2006). Investigating explicit and implicit attitudes provides a more comprehensive understanding of human attitudes towards wolves. In our study, the experimental group showed a significant reduction in the frequency of drawings depicting wolves with sharp teeth, whereas no similar trend was observed in the control group. Humans tend to associate sharp objects with aggression (Bar & Neta, 2006; Hess et al., 2013; Watson et al., 2012). Therefore, the reduced frequency of sharp teeth in drawings by the experimental group reflects a positive, unconscious attitude change towards wolves in the participants.

Analysis of word associations is an easy method used to examine attitudes and opinions towards animals. Snakes are most frequently associated with venom and fear (Torkar, 2015), bees with honey, and butterflies with beauty (Sumner et al., 2018). We used an experimental approach in our study to examine whether the frequency of words associated with wolves changes after the lecture. There was a shift of word frequency in participants from the experimental group from neutral words or words associated with fear to words describing positive characteristics of wolves (caring, shy) and their importance in food webs. However, no similar trends were observed in the control group, suggesting that the lecture significantly influenced participants' attitudes towards wolves. Certain frequent words in the control group (big, sharp teeth) might be considered personally threatening in the physical term. Therefore, they may be associated with fear of the wolf (Sevillano-Triguero et al., 2023). Considering wolves as dangerous and unpredictable increases the likelihood of fear of them, leading to low social trust (Johansson et al., 2012). Both groups showed increased scores of cognitive items, suggesting that factual knowledge about wolves increased (e.g. wolf senses) (Oražem et al., 2019).

Simultaneous investigation of explicit and implicit attitudes toward animals, or, more generally, toward the wildlife, is important from practical and theoretical reasons. Firstly, true human intentions measured only by explicit attitudes can be concealed by people to meet social norms and expectations (Greenwald et al., 2009; Podsakoff et al., 2012). Secondly, it is still not clear whether implicit (Friese et al., 2012) or rather explicit attitudes (Echeverri et al., 2017) are better predictors of human behaviour, because results are mixed (Wang et al., 2020). This issue is important not only from a theoretical perspective but also in research on human willingness to support the conservation of animals (Echeverri et al., 2017). Thirdly, implicit, unconscious measurements often offer information that is not always revealed by explicit self-reports (Wojnowicz et al., 2009). This means that measurement of implicit attitudes contributes to a more objective understanding of one's values and motives than measurements based exclusively on explicit attitudes. All these issues are particularly important in the case of the wolf, an animal which elicits ambivalent emotional reactions (aggression [negative trait], large size, and high intelligence [positive traits], Prokop et al., 2023; Sevillano & Fiske, 2016), which makes research in this field more complicated. We did not observe any inconsistency between explicit and implicit attitudes toward wolves. All measurements produced consistent results, suggesting a strong interplay between conscious (explicit) and unconscious (implicit) measures.

Limitation

The intervention was located in a middle-sized town outside of wolf territory. People living in areas where predators occur show less favourable attitudes towards larger predatory animals (Røskaft et al., 2007; Zimmermann et al., 2001). Additional research is needed to address these possible differences across populations from rural to urban locales.

Conclusion

The teacher-centered discussion in our study influenced participants' attitudes towards the grey wolf by highlighting the crucial role of wolves in ecosystem functioning. This emphasis on their significance proved to be instrumental in fostering delicate relationships between humans and predators. Wolves can be controversial carnivores whose coexistence with humans depends on peoples' tolerance and willingness to support their conservation. Our results agreed with Rachman's (1977) theory of fear acquisition as positive attitudes towards wolves were successfully acquired through the provision of information/instruction. Our study was not designed to reduce the fear of wolves but to improve overall attitudes towards them. We see two major challenges for future research. Firstly, our data does not allow us to make broader generalisations regarding participants' attitudinal change in time, which is crucial for sustainable coexistence with large carnivores. Secondly, participants from the experimental group were not shown videos showing wolves hunting. We acknowledge that this component is an inseparable part of the ecology of carnivore predators. However, we are not sure at which age children should view videos that may not contribute to lowering the acceptance of wolves. Perhaps not focusing on hunting, but depicting a pack of wolves could accurately illustrate their ecological relationships. Some nature documentaries maintain that carnivore attacking prey is not suitable for children. Further research of this question is warranted.

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Ethics statement

The study was approved by the institutional review board at Trnava University (licence no. KEIV2/2023).

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Appendix

The wolf attitude questionnaire

P = positively worded items, N = negatively worded items scored in a reverse order
Wolves are essential for maintaining the balance in nature (P)
I am afraid of wolves (N)
The wolf kills innocent animals (N)
One wolf usually leads a wolf pack with a female (P)
All wolves should be poisoned (N)
The wolf hunts to feed its pups, which would otherwise perish (P)
I would be afraid to go there if I knew a wolf was in the forest (N)

The she-wolf diligently takes care of the pups (P)
The wolf kills anyone who enters its territory (N)
If all wolves were wiped out in nature, nothing would happen (N)
Wolves also feed on mice (P)
I hate wolves (N)
The wolf lives only a solitary life (N)
Wolves should be protected (P)
Wolves are not dangerous to humans (P)
The she-wolf gives little food to the pups; that is why she is called 'wolf mother' (N)
The wolf is part of the food chain (P)
Only a dead wolf is a good wolf (N)
The she-wolf usually has only one pup (N)
I find the wolf likeable (P)
Wolves hunt any animals to satisfy themselves (P)
I enjoy reading about wolves or watching movies about them (P)