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Love Off, Fear On? Brown Bear Acceptance by Teenagers in European Countries with Differing Population Statuses

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Abstract: The acceptance of large carnivores is one of the key issues for their conservation. We analyzed the level acceptance of brown bears (*Ursus arctos* Linnaeus, 1758) amongst 10–18 year old school students in four European countries using anonymous questionnaires. Our aim was to characterize the drivers of species acceptance, described as a rural–urban cline, as well as fear levels and the respondents' familiarity with bears. We found lower levels of acceptance of bears were related to fear of bears and that bear acceptance was not higher in the bear-inhabited countries, but urban inhabitants tended to better accept the species. Factor analysis revealed the importance of country-related aspects, familiarity with bears, experiences in human-wildlife conflict, gender-age differences, respondent's relationship to nature and the origin of their knowledge of the species. We consider that bear-related education and mass media in Latvia and Lithuania could reduce fear of these animals and sustain their acceptance, while human–wildlife conflict management measures in Bulgaria and Turkey are recommended to boost the appreciation of the species.

Keywords: *Ursus arctos*; species acceptance; schoolchildren; human–carnivore conflict; fear

1. Introduction

Differing approaches to the conservation of large carnivores (LC) are generally based on differences in political history [1], species acceptance [2–5] and understanding of human dimensions (HD) [6,7]. Within Europe, most HD studies on LC do not originate from across the entire continent of Europe, but rather are more limited. For example, HD studies regarding brown bear (*Ursus arctos* Linnaeus, 1758) are numerous in the Nordic countries [1,8], though acceptance of the species by young people is under-represented [9].

Acceptance of damage-causing species by local people is usually related to multiple factors, including psychological ones [10,11]. For instance, shifts in landscape structure due to agriculture [12,13] and land abandonment, as well as changes in societies and culture may affect the equilibrium of human-carnivore cohabitation [14,15]. It has been shown that teenagers' acceptance might be more crucial than the adult acceptance for the future of wildlife conservation. Perceptions and attitudes in students can be changed more easily than in adults—the beliefs of teenagers are mostly formed

between the ages of 10 and 13 years, these consolidated at around 16 years of age. Therefore, early age positive attitudes can be developed into more nature friendly views and may foster wildlife conservation in the future [9]. In this study, we focus on brown bear (BB) acceptance by teenagers, as this is indicative of the future of conservation of the BB and other large carnivores. Teenagers are also important in the light of the current trend of scientific ignorance in society and the rapid decrease of interest in biology among schoolchildren [16]. Gender differences in the aforementioned issues are well expressed, as well as a decreasing interest towards animals in older children [17].

Teenager attitudes toward LC species depend on several factors, one of which is the presence of a LC species. In Lithuania wolf (*Canis lupus*) acceptance has been found to be directly related to their presence in the region [18]. In Norway, where the wolf population is minimal, wolf was rated as the most dangerous animal by children and adolescents (9–15 years) regardless of respondents' age, with girls expressing more negatively [19]. The rural–urban cline is also very important in the planning of the future of LC conservation [12]. Removed from the direct arena of human-carnivore conflict, young people living in urban areas are able to more rapidly change their attitudes towards nature and conservation, developing a positive LC acceptance [20]. However, urbanization cannot be seen as a solution to human–wildlife conflicts because the actual conflict may not, in reality, concern the wildlife. All conservation or damage-related conflicts are ultimately between humans with different interests, views and values [21], e.g., urban vs. rural inhabitants.

Differences in species acceptance between even neighboring countries may be unexpectedly high: in three Baltic countries for example, results relating to wolf acceptance were radically different, with 80% of Lithuanians worried about their safety in relation to wolf, while this figure was just 30% in Estonia [22]. The BB is the largest LC species in Europe, thus the lowest level of acceptance and the highest level of fear by respondents is presumptive mostly in the eastern and north-eastern Europe. Species conservation measures and increased BB numbers can result in reduced species acceptance [23]. However, this is not necessarily the case. In Italy for example, differences between various respondent groups were outweighed by a generally positive attitude towards LC, including brown bears [24]. Likewise, unexpectedly, in Slovenia very positive attitudes were recorded despite high BB numbers and incurred damage [25]. Similarly, respondents in Latvia expressed more positive attitudes towards BB than for any other LC species [26]. In Lithuania, a country with no permanently living BB, the animal was also positively valued, but respondents at the same time expressed a high level of fear for their safety [27]. Across the region however, the attitudes of teenagers and their acceptance of BB are generally less known. The only specialized study was carried out in Turkey, with the key findings being no gender differences, marked differences between urban and rural inhabitants and the main factor driving a negative attitude being personal experience with an animal [9].

Most surveys of LC acceptance involve the adult sector of the society, despite the young generation being very important for the future of nature conservation [28]. Under recent positive changes in the status of LC and BB across Europe [29], we decided to compare BB acceptance in four countries, these each differing in species status and numbers, inflicted damage and poaching, differing cultures and relationships to outdoors among the respondents. We used not a sociological, but a human dimensions framework, focusing on the teenagers' knowledge, values and BB acceptance [2,7,9,19,22,23,26,27]. Our work is close to the cognitive hierarchy approach of human dimensions of wildlife as in [30], with a focus on how teenager's knowledge, attitudes and values affect their BB acceptance. Possible implications to conservation education were discussed, but we were not seeking to find instruments for modifying the behavior of the teenagers. However, as a by-effect, there was a spread of information on BB between teenagers occurred in the schools under our survey.

Our aim was to characterize the drivers of species acceptance, described as differences in the species presence between the countries, clines in the rural–urban inhabitation of the respondents and, in particular, their relationship to nature as well as their familiarity and encounters with bears. We tested three hypotheses: **H1** was that bear acceptance is higher in the countries where they are

constantly present compared to so-called no-bear countries; **H2** stated that urban inhabitants would better accept the species; **H3** stated that a lower acceptance was related to fear of the species.

2. Material and Methods

2.1. Survey Sites, Sample Size and Structure

The survey of BB acceptance by teenagers was conducted in Latvia, Lithuania, Bulgaria and Turkey, characterized by differing bear population statuses. Based on the authors' knowledge, BB are regular in Latvia, though there are no breeding records, whereas Lithuania has no permanent population—both are referred to as no-bear countries. The two other countries are bear-inhabited. There are about 600 individuals in Bulgaria (Figure 1) and, at a moment of questioning, there were up to 4000 individuals in Turkey [9]. In all countries, bears are protected, but poaching levels differ.
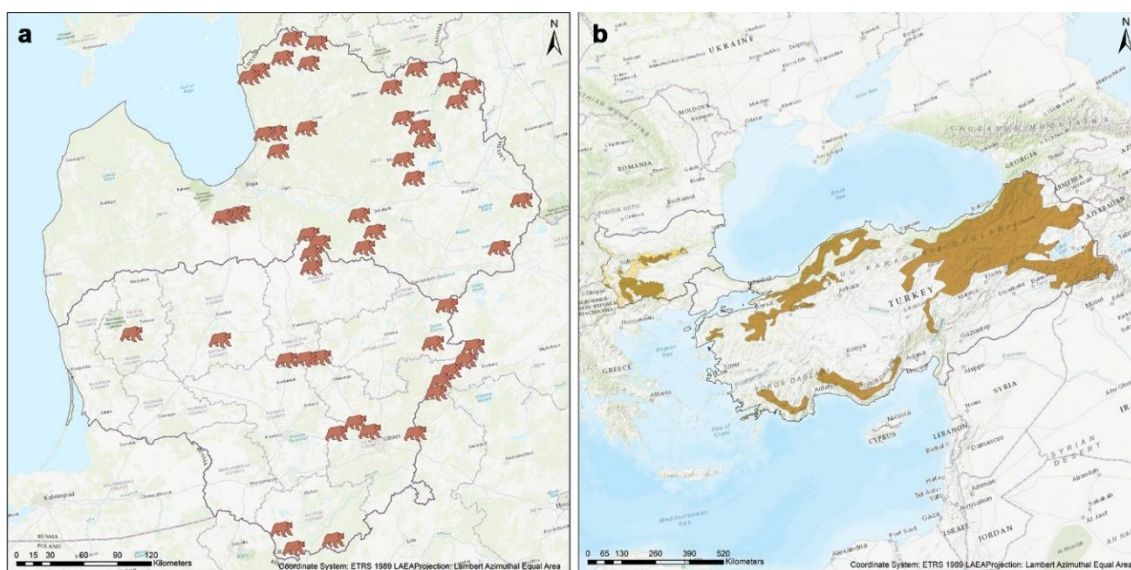

Figure 1. Brown bear registrations: (**a**) in Latvia and Lithuania; (**b**) distribution in Bulgaria and Turkey. Dark color denotes permanent presence, light color seasonal or occasional bear presence and bear silhouettes denote observations of individuals. Data sources: Lithuania—citizen science project on LC survey, 2015–2018 (Balčiauskas et al. unpubl.); Latvia—Action Plan for Brown Bear *Ursus arctos* Conservation [31]; Bulgaria—Action Plan for the Brown Bear in Bulgaria [32]; Turkey [10].

The population status in Lithuania is now characterized by an increasing number of BB visits from neighboring countries. In the period 2015–2018, there were over 20 visits registered, with one possible case of wintering. No damage has been incurred and there have been no conflict situations with humans. In Latvia, BB numbers are also increasing [31]. Registrations in the period 2012–2016 are presented in Figure 1. Damage so far has been occasional, but has increased recently, mainly in the form of raiding bee-hives. In Latvia, HD are emphasized by the recently renewed Action Plan for Brown Bear Conservation [31]. A damage compensation system has been introduced and citizens are encouraged to report observations of bears. Bulgaria is characterized by moderate poaching (20–30 animals per year), with an additional 6–10 problem bear per year culled [32]. Damage levels are highest in the Rhodopi Mountains, with 50–110 cases per year. Bear attacks on humans have also been recorded, with one fatality in 2010. Probably the highest level of poaching occurs in Turkey, where poaching control has decreased in recent years. In addition, not on an annual basis, intermittent trophy hunting of 5–10 individuals per year is permitted on problematic individuals, albeit this without reliable information [10]. There is a fine for illegally killed or poached individuals (approximately 2700 Euro for 2019). Some (from 5 to 10) individuals are roadkilled every year. Damage levels have

increased since 2010 and, in the last 5 years, at least 12 people have been killed and 15 people severely injured by BB in Turkey [10].

As bear abundances between countries differed, therefore nationality is used as proxy for the independent variable "presence of species at national level".

In total, we distributed over 2000 questionnaires in 2017 and collected 1796 responses: 298 in Lithuania, 836 in Latvia, 348 in Bulgaria and 309 in Turkey, collected in 2006–2007. The respondent samples in the four countries were prevailingly rural: 68.7% in Latvia, 67.8% in Lithuania, 63.5% in Bulgaria and 73.1% in Turkey, with uniform distribution on the rural-urban axis ($\chi^2 = 7.1$, NS). The urban sample from Latvia (n = 262) was mainly from the capital city Riga (n = 159) and the second city (by size) Daugavpils (n = 87). The rural sample (n = 574) was distributed both across the north-eastern part of the country with frequent bear observations and damage claims and the south-western and central parts of the country where bears are very rare or are never registered. In Lithuania, the urban sample (n = 96) was from the third largest (by size) city Šiauliai, while rural respondents were from the northern and north-western part of the country. The Bulgarian urban sample (n = 127) was from capital city, Sofia. Rural respondents from Bulgaria were from three regions, the Central Balkans (n = 89), the Pirin Mountains (n = 36) and the Rhodopi Mountains (n = 96), representing the major part of the Rilo-Rhodopean and Central Balkan BB sub-populations. Urban respondents from Turkey were from the capital city, Ankara (n = 98), and rural respondents were from Yusufeli County (n = 211) in north-eastern Turkey.

In all countries, the respondent gender distribution was 1:1 and between-country differences were not significant either ($\chi^2 = 3.8$, NS). The distribution of age between countries was not uniform (Kruskal-Wallis, H = 294.6, $p < 0.001$). The average (±SD) respondent's age in Bulgaria was 12.65 ± 1.41 (range 11–18) years, in Turkey 12.89 ± 1.12 (10–15), in Latvia 13.87 ± 1.06 (11–16) and in Lithuania 14.28 ± 1.87 (11–17) years. Marginal frequencies on both sides of the range were small: 98.3% of respondents were 11–16 years old (Figure A1). However, answers of marginal respondent groups were not significantly different from the other age groups, thus we did not exclude these groups from further analyses.

2.2. Methods of Sampling

We used anonymous questionnaires distributed through schools under informed consent by schoolchildren. At the time of the survey, none of the surveyed countries required approval from ethics committees. In Lithuania, permission was granted by the directors of the schools, and questionnaires were distributed by one of the paper authors. In Latvia, a national meeting of the Biology Teachers' Association was used to engage teachers, who then disseminated the questionnaires in classes. Some schools in under-represented regions were supplementary involved later by contacting teachers. All teachers were provided with as many printed questionnaires as they would accept. Completed questionnaires were returned by regular mail. In Bulgaria, the questionnaires were distributed in schools and collected by the educational staff of three national parks (Rila, Pirin and Central Balkan) and the staff of the Regional Inspectorate for the Environment and Waters, with the consent of the school directors in charge. In Turkey, permission was given by the district director of the Department of National Education and managers of the schools.

For each country, big cities were selected to represent urban population. The rural population was represented from parts of the countries, where bears are present. Schools were selected in a random way (using a map and list of schools), except Turkey [9], and classes in the school were selected by chance—i.e., by the presence of the teacher on arrival of the person distributing questionnaires. Participation in the survey was anonymous and voluntary (for this reason response rate was nearly 100% in all involved countries), teachers were present or not at their own discretion. Before the distribution of the questionnaires, brief introductions about the aim of the survey and about brown bears were given, which were similar in each country.

2.3. Structure of the Questionnaire

The questionnaire incorporated eighteen questions. Most questions were binary (Yes/No) or had nominal answer categories, while some questions were close-ended and utilized a 5-point Likert scale. From an English version of the questionnaire (Figure 2), uniformly accurate translations were prepared in each of the national languages by native speakers.

Figure 2. Questionnaire used (English version shown). All national questionnaires were identical, with the exception of questions 17 and 18. In the Latvian and Bulgarian versions, jackal was used instead of leopard (used in the Lithuanian and Turkish versions), based on countries specificity.

A few questions with demographic elements, such as gender, age and living place, were included. Urban or rural categories were attributed to the living place when processing the answers.

Species acceptance was evaluated by questions No 4–7 and 9 (Figure 2). Rating of bear acceptance (question No 17) or fear (No 18) was conducted in comparison with other species. The respondents' willingness to see bears in their region in the future, what management solutions are acceptable for problem animals (questions No 8 and 19) and knowledge about bear hunting were evaluated. We also checked the presence of personal contacts with an animal and the presence of conflict situations due to incurred damages (questions No 14 and 16).

We also checked respondents' relationships to nature/outdoors, as this was connected to Hypothesis H2. Finally, sources of information on the brown bears and the willingness to know more about the species were assessed.

2.4. Statistical Analysis

Sampling adequacy was tested using the Bartlett's Test on Sphericity (BTS) and Kaiser–Meyer–Olkin (KMO) measure [33]. The value of the measure of sampling adequacy (MSA) for each variable was higher than 0.05.

The cumulative acceptance score for each respondent was calculated by summing up positive answers to questions 4, 6, 7 and 9 (Figure 2). Each positive answer was ranked 1, thus making up the variable "*Acceptance*" which ranged from "0" to "4".

The significance of differences in proportions (male:female, age groups, etc.) was tested using chi-square χ^2, with prior formation of contingency tables. To explore if the means of the samples were significantly different, we used ANOVA and the Tukey post hoc test for unequal sample sizes [34]. This analysis was used to test if the groups of youngest and oldest respondents differed in their evaluation and thus should be excluded.

If the condition of normality was not met (tested by Kolmogorov-Smirnov test), non-parametric Mann-Whitney U test in the case of independent samples and the Wilcoxon signed ranks test in the case of dependent samples were used [35].

To discover what the main drivers of brown bear acceptance were among teenagers, factor analysis was carried out using the Principal Components Analysis (PCA) method [34,35], with Varimax rotation and Kaiser normalization, extraction value >0.5 after assessing sampling adequacy with KMO and Bartlett's Test of Sphericity [33,36].

Calculations were done using IBM SPSS Statistics Base 26.0 [37] and Statistica for Windows ver. 6.0 [36].

3. Results

3.1. Bear Acceptance in Relation to Species Presence (Country-Related Differences)

Contrary to the expectation of H1, that bear acceptance is higher in the countries where they are constantly present, the cumulative acceptance score was the same for bear countries (mean score 2.27) and no-bear countries (mean score 2.33) (Z = −0.652, NS). Thus, H1 was rejected.

However, some differences were found while analysing individual questions. The general opinion about BB in bear countries and in no-bear countries did not differ, with 64.0% and 65.6% positive answers, respectively (χ^2 = 0.48, NS). At the country level, teenagers from Turkey were most positive (81.0%), while teenagers from Bulgaria were most negative (51.8% of answers positive). Latvian and Lithuanian teenagers had similar level of positiveness (64.3% and 63.1% of answers positive, respectively).

The proportion of positive answers to the question "Are bears cute?" in the bear and no-bear countries was statistically the same (64.5% and 61.8%, respectively, χ^2 = 1.32, NS). The difference between countries was significant: bears were named as cute by 73.8% of Turkish, 64.2% of Latvian, 56.2% of Bulgarian and 55.9% of Lithuanian teenagers.

Residents of no-bear countries were much more positive answering the question "Is it good or bad that bears are in your region?" than among those in the bear countries (47.5% and 35.8%, respectively, χ^2 = 23.26, $p < 0.001$). Differences between countries were even more expressed: the answer "good" was used by 58.0% of teenagers from Latvia, by 53.1% from Turkey, but only by 20.2% from Bulgaria and 18.1% of teenagers from Lithuania. Teenagers from the bear countries more frequently answered that the presence of bears indicates a good status of natural processes (Z = −2.99, $p < 0.05$).

3.2. Urban–Rural Cline in Bear Acceptance

Cumulative acceptance scores among urban residents were higher than among rural ones (mean scores 2.46 and 2.24 respectively, Z = −3.208, $p < 0.05$), thus, hypothesis H2 was confirmed. On the individual questions from the cumulative score, some differences were found and are presented in Table 1.

Urban residents had a better general opinion about bears (χ^2 = 13.55, $p < 0.001$) and they more frequently thought bears are cute (χ^2 = 21.56, $p < 0.001$). Contrary to expectation, urban residents did not differ from rural ones about bear presence in the region (χ^2 = 0.19, NS) or the role of brown bears indicating the status of natural processes (χ^2 = 0.32, NS). As expected, urban residents were more afraid of bears—80.4% of urban teenagers answered positively compared to 67.2% of rural teenagers (χ^2 = 37.33, $p < 0.001$).

Table 1. Differences between brown bear acceptance in urban and rural respondents, irrespective of the country. Used to obtain the cumulative score, data of answers to the questions are presented. Answers were divided into positive and other (neutral and negative variants pooled).

Question	Rural Respondents		Urban Respondents	
	Positive, n (%)	Other, n (%)	Positive, n (%)	Other, n (%)
What is your general opinion about bears?	750 (61.8)	464 (38.2)	397 (70.8)	164 (29.2)
Do you think bears are cute animals?	719 (59.1)	497 (40.9)	396 (70.6)	165 (29.4)
Do you think bears living in your region are a good or bad?	523 (42.9)	696 (57.1)	249 (44.0)	317 (56.0)
Bears living in your region is an indication that natural processes are going well.	726 (59.7)	491 (40.3)	1071 (60.1)	711 (39.9)

3.3. Acceptance and Fear of the Brown Bears

Fear level was relatively well expressed, and teenagers from no-bear countries had lower fear (χ^2 = 48.81, $p < 0.001$) compared to those from countries with bears (Table 2). Differences between Lithuania and Latvia are significant (Z = −0.28, $p = 0.005$), while those between Bulgaria and Turkey are not so expressed (Z = −1.81, $p = 0.071$).

Table 2. Differences between fear of the brown bear in teenager respondents living in the bear (Bulgaria, Turkey) and no-bear (Latvia, Lithuania) countries. Answers to the question "Are you afraid of bears?" are presented.

Country	Yes, Afraid a Lot, n (%)	Yes, Afraid a Bit, n (%)	No, I Am Not Afraid, n (%)
Latvia	125 (15.0)	524 (63.0)	183 (22.0)
Lithuania	40 (13.4)	164 (54.8)	95 (31.8)
Bulgaria	84 (24.3)	181 (52.5)	80 (23.2)
Turkey	100 (32.3)	144 (46.5)	66 (21.3)

Fear of the brown bears played a crucial role in *acceptance* of the species, influencing all aspects (Table 3). In question 5, "Yes (quite a lot)" and "Yes (a little bit)" scored 1.68 and 2.39 respectively, while feeling no fear scored 2.61 (afraid vs. not afraid Z = −5.521, $p < 0.001$) Those who confirmed fear of bears had a lower general opinion about bears (χ^2 = 17.58, $p < 0.001$), stated bears are less cute (χ^2 = 20.06, $p < 0.001$), less valued bears in the region (χ^2 = 29.08, $p < 0.001$) and less recognized bears as indicators of healthy ecological processes (χ^2 = 33.75, $p < 0.001$). Thus, H3 was confirmed for both bear and no-bear countries, with a negative opinion 4–7 times more expressed among those who fear the bears.

Table 3. Acceptance of the brown bears depending on fear. Data from all (bear and no-bear) countries pooled.

Question	Answer	Afraid of Bears	
		Yes, n (%)	No, n (%)
What is your general opinion about bears?	Positive	837 (62.0)	309 (73.2)
	Other	512 (38.0)	113 (26.8)
Do you think bears are cute animals?	Positive	812 (60.1)	303 (72.1)
	Other	540 (39.9)	117 (27.9)
Do you think bears living in your region are a good or bad?	Positive	538 (39.6)	230 (54.5)
	Other	820 (60.4)	192 (45.5)
Bears living in your region is an indication that natural processes are going well.	Positive	803 (59.3)	262 (62.1)
	Other	552 (40.7)	160 (37.9)

3.4. Main Drivers of Brown Bear Acceptance Among Teenagers

Five extracted factors explained 50% of variance (Table A1). The first factor, explaining 16% of variance, was predicted as "*It is a cute and useful animal which I would like to know better*". The best acceptance was from respondents positively evaluating brown bears and wishing to learn more about these animals. Notably, over 70% of teenagers in all investigated countries would like to know more about brown bears, irrespective of species status and the different ways they gained information about these animals (Figure 3).
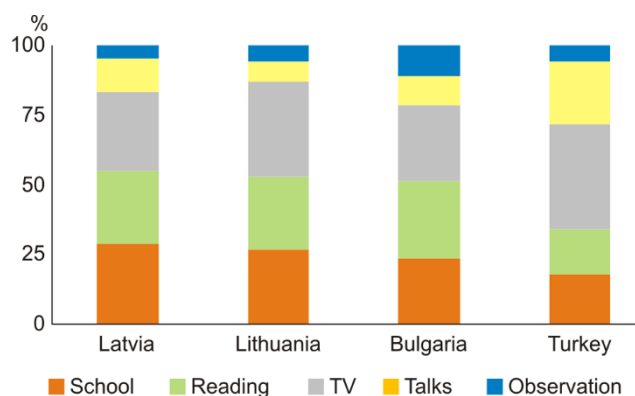

Figure 3. Sources of knowledge about brown bears in the four surveyed countries as reported by teenage respondents.

The second factor with 10.4% of explained variance could be named "*Older respondents from bear countries support humane methods of management*" as this was negatively related to respondent's age. In question 19 "In your opinion, how should authorities deal with problem bears?" hunting gave a minimum score, while more humane measures were scored higher.

The third factor "*Gender related fear*" explained 8.3% of variance. The fourth factor "*Way of life*" consisted of urbanization, the respondent's time spent outdoors and bear hunting (poaching) in their area and explained 7.8% of variance. The fifth factor "*Damage and personal encounters*" explained 7.5% of variance (Table A2).

4. Discussion

Our results show that urban lifestyles resulted in higher expressed levels of BB acceptance by teenagers in four European countries, while fear among respondents determined lower levels of acceptance. Bear presence or absence in the country had no influence. Factor analysis revealed importance of familiarity with bears, experiences in human-wildlife conflict, gender-age differences, respondents' relationship to nature and the origin of their knowledge of the species.

4.1. Country-Related Differences

We analysed BB acceptance in countries having different kinds of problems with the LC. In Lithuania, the species was not listed in the new Red Data Book prepared in 2018. As the frequency of visiting BB has increased in recent years, mass media warnings about the possible dangers of BB have not contributed to positive species acceptance. In Latvia, the number of BB is not large, though damage cases have started to appear. Recent experience has shown that a compensation system alone is unlikely to improve species acceptance: apiary owners need to be educated in regard to damage prevention measures and also be provided with financial support. There is an increasing demand by inhabitants for guidance how to behave when encountering bears. The two countries with permanent BB presence, Bulgaria and Turkey, have constant bear-related conflicts with local people and need to manage maintaining their high population sizes, while avoiding poaching and damage. In Bulgaria, the fear of bears and a negative attitude towards the species in the country increased exponentially

after a man was killed by a bear in the Rhodopi Mountains in 2010 [38]. In Turkey, increasing conflicts with BB (e.g., bear attacks on people) seems to cause resentment among locals mainly in the eastern and western Black Sea Regions [10].

Differences in LC acceptance between countries are documented, but not well explained [39,40]. In Turkish children, wolf acceptance was higher and fear of wolves lower than in Slovakia [41]. Authors suggested two explanations: the first is difference in stories forming children's emotions, and the second factor is activities related to nature. In our understanding, the relationship to nature among teenagers is becoming more and more important under the current decline of interest in biology [16]. In our research, the fourth factor of BB acceptance, "Way of life", included not only urbanization, but also time spent in nature. We found that time spent outdoors by teenagers in rural Turkey (mostly agriculture-related activities) was correlated with their positive BB acceptance.

Everyday encounters are very important for knowing various animal species [42]. Factor 5 of the BB acceptance in our study included encounters by respondents with bears and bear-incurred damages (both very unlikely in the no-bear countries). In Slovenia, however, the key factor in predicting the attitude towards bears was the perception of how harmful the bears are [25], not their real damage and its regional differences. It is possible that differences in LC acceptance are of economic background—related to the GDP of the countries [1] or changes in the rural economy [15].

4.2. The Urban-Rural Cline as a Factor of Species Acceptance

The urban-rural cline in animal (including also LC) acceptance is possibly the main one and is almost always present [8,43–47]. Places of birth and current residence have been shown to be important [48]. LC population control was favored by rural respondents in Latvia [26]. Likewise, in Lithuania, eradication of wolves and lynxes were preferred by rural inhabitants [18,22], the same as with BB [27]. The urban–rural cline was already known as important in the acceptance of BB and for disliking different wildlife species in Turkey [9], we here reconfirm these differences. In rural communities, family issues may have a very strong influence [49]. For example, in Bulgaria, the most negative attitudes among teenagers towards bears were found in the Rhodopi Mountains (our study), where the most negative attitudes in adults were also found [37], this implying a possible family influence. However, these were not tested in our study. Still, differences in BB acceptance between urban and rural inhabitants should be acknowledged in the conservation education programs.

4.3. Damage, as a Factor in Large Carnivore Acceptance

Urban inhabitants rarely suffer damage from wild animals; hence the issue of LC damage seems closely related to the urban-rural cline of their acceptance [10,38]. Analysis of the bear management systems between 2005–2012 from 26 European countries, including Latvia and Bulgaria, showed that over 3200 cases of BB incurred damage were compensated for in Europe annually, mainly in the Mediterranean region and in Eastern Europe [50]. At that time, within the Baltic bear range, losses were compensated for only in Estonia, where damage level was minor compared to bear numbers and claims were mostly related to apiaries. In Bulgaria, livestock (sheep) damage is equally important as beehive destruction and claims per year in the management unit of the Bulgarian Rhodopi (Eastern Balkans) are twofold more than in Estonia. There is no damage compensation in Turkey similar to EU countries except the government subsidized agricultural insurance system. The students with low acceptance of bears were mostly related to the ones having bear damage.

4.4. Influence of the Respondents Age

The way of obtaining knowledge on LC differs between age groups and countries [41]. In our study, the main source of knowledge in all countries was TV, while school was also very important in no-bear countries, along with reading in Bulgaria, and verbal information (talks) in Turkey (see Figure 3). With children generally spending more time watching TV in modern times [51], these channels (school and TV) could be used in the formation of BB acceptance.

Several studies of teenagers' or children's attitudes towards LC had very important findings concerning the ages of respondents. In general, younger children seem more positive to carnivores than older ones [46,52]. In Norway, rural communities were found to be diverse in their attitudes to LC, with younger respondent groups being more positive attitudes towards BB [20]. Also, boys in general were more positive [52]. As found by Schlegel and Rupf [53], animals inducing fear in respondents, such as bears and lynxes, are less acceptable among young respondents compared to other animals. These authors emphasize that low appreciation of such animals may be softened by good background information in educational institutions.

4.5. Education for Conservation

Thinking about the future of LC conservation, we should not ignore the attitudes of the coming generation [17]. Carnivore interactions with humans will depend on the ecology of species, as well as on people's opportunities and behavior [54]. It is important to acknowledge that the acceptability of LC management is not only guided by what people think, but also by what they feel [55]. Fear of LC is characteristic to humans independent of age [56], and the understanding of animals, intellectually and cognitively, occurs mainly between the fifth and eighth grade [57].

After analysis of 59 countries with resident bear populations, it was found that educating people and the raising of public awareness can be tools to resolve human-bear conflict [58,59]. More people typically use the internet as their primary source of information, so information on human–animal interactions is very important [55], yet online sources do not always lead to raising species acceptance. For example, search in the main internet portals in Lithuania (sources checked www.delfi.lt, www.lrytas.lt, www.15min.lt, www.valstietis.lt) for news concerning brown bears (2010–2018) revealed that the main message was along the lines of "we have visiting bears after a hundred years of extermination, that's nice, but they might be dangerous to humans" (Balčiauskas, Balčiauskienė, unpubl.). However, as shown in Latvia, the internet, TV and radio are the main sources of information about LC [31]. In the Latvian *Action Plan for Brown Bear Ursus arctos Conservation*, the need to inform society is foreseen, though not targeting specifically to different age groups [31].

Children and teenagers, however, may require special methods, for example, residential outdoor environmental education [60]. The main factors that most effectively decrease bear-related conflicts in Bulgaria (and the urge for locals to take the law into their own hands) are the timely compensation for damage, government support for preventive measures and awareness raising [32]. Yet, these measures do not necessarily lead to a decrease in negative attitudes towards bears in adults (and, given family cohesive thinking and influence, in teenagers) in areas with intensive conflicts [38].

From early grades, gender and culturally inclusive science teaching strategies should be used to educate students about wildlife species [16]. Teenagers' concerns about animals are formed during grades 8–11, thus this stage "offers the best opportunity for teaching about ethical relationships to animals and the concepts of ecology and wildlife management" [57]. In Lithuania, an ongoing upgrade of school programs and textbooks, as well as university reorganization, is a good opportunity to include LC advocacy. In Turkey, education is currently based on standardized tests, therefore the usage of wildlife documentaries has been proposed to develop better LC acceptance [9]. Swedish scientists pointed out that place of residence is a more important driver of attitude than age or socializing. However, the level of social interactions in society is increasing [46]. Agreeing with [61,62], we presume that for teenagers, the internet is one of the ways of socializing and education. Through this means, it is possible that the carnivore-positive opinion of urban inhabitants could easily be delivered to rural inhabitants, overcoming the negative acceptance created by damage due to these predators.

5. Conclusions

1. We identified important factors influencing differences in BB acceptance among teenagers of four countries with different brown bear numbers and statuses.

2. Country specific studies on teenagers' attitudes could help to identify the formation of these attitudes and how to improve them, revealing ways for new approaches to boost conservation thinking in the new generations.

3. Maintaining or increasing BB acceptance could be achieved through mass media channels, such as TV and the internet in particular.

4. School curriculum changes regarding wildlife and residential outdoor environmental teaching would be helpful to nurture positive attitudes and acceptance regarding LC. Awareness-raising campaigns are considered likely to be effective in all four countries.

Conflicts of Interest: The authors declare no conflict of interest.
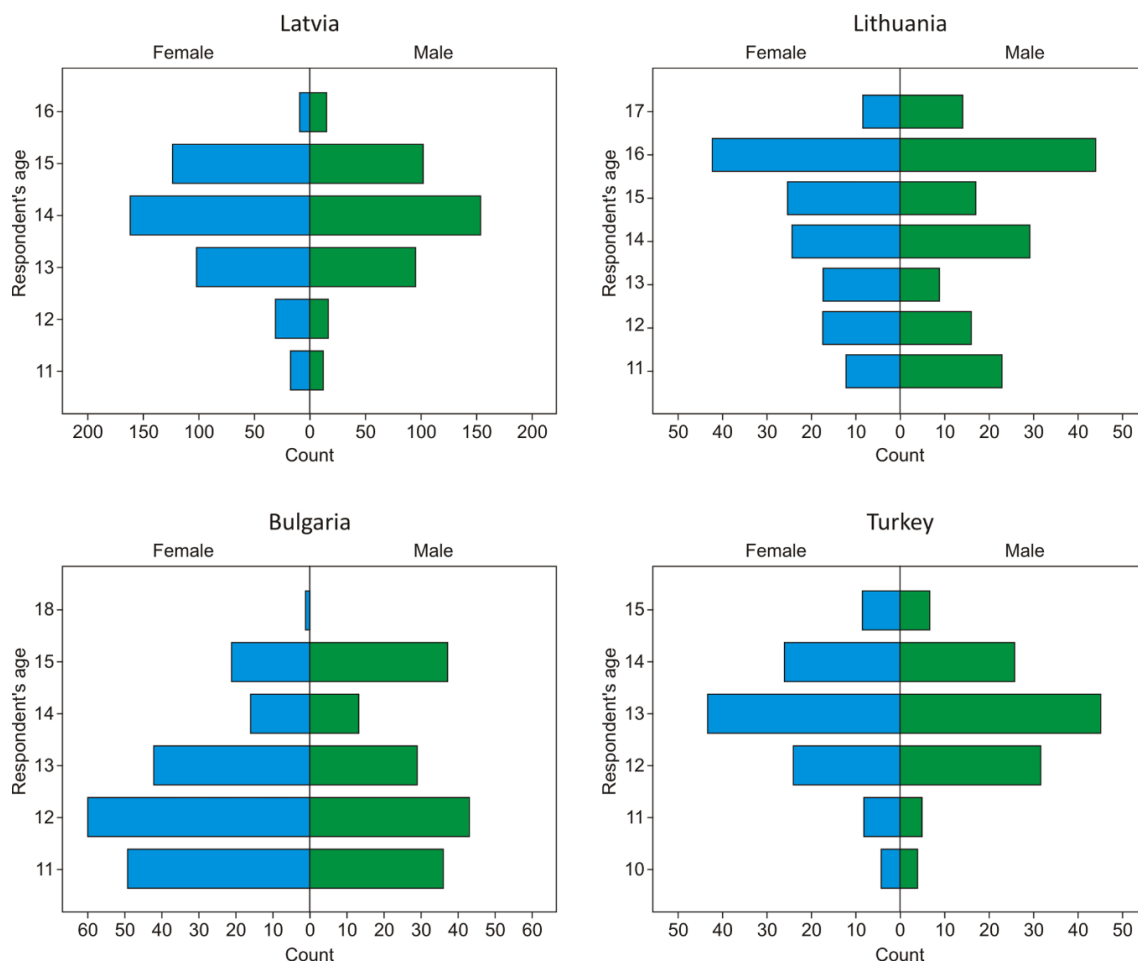
Appendix A

Figure A1. Gender and age distribution of respondents in the four surveyed countries.

Table A1. Results of the factor analysis: eigenvalues and explained variance.

Component.	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.715	16.972	16.972	2.564	16.027	16.027
2	1.606	10.035	27.006	1.663	10.394	26.421
3	1.310	8.190	35.196	1.332	8.326	34.748
4	1.279	7.991	43.187	1.242	7.760	42.507
5	1.092	6.827	50.015	1.201	7.507	50.015

Extraction Method: Principal Component Analysis. KMO = 0.714, Bartlett's test of sphericity $\chi^2 < 0.001$. First five factors shown, explaining over 50% of variance.

Table A2. Rotated Component Matrix.

Questions	Component				
	1	2	3	4	5
Q5 Are you afraid of bears?	−0.273	−0.094	**0.662**	0.124	−0.084
Q4 What is your general opinion about bears?	**0.672**	0.002	−0.219	0.054	−0.074
Q6 Bears are cute animals?	**0.636**	0.059	−0.069	−0.052	−0.190
Q7 Bears in your region good or bad?	**0.605**	0.316	0.083	−0.039	0.187
Q8 Would you like bears continue to exist in your region in the future?	**0.736**	0.166	−0.011	0.075	0.147
Q9 Bears living in your region are an indication that natural processes are going well?	**0.570**	−0.092	0.065	−0.064	0.062
Q10 Which time of the year do you spend in nature?	0.094	0.204	0.017	**0.535**	0.068
Q13 Are bears being shot in your region? (no neutral option for TR ant LV)	0.043	0.111	0.408	**−0.624**	0.347
Q14 Have you ever had a close encounter with a bear (25 m or closer)?	0.097	0.006	−0.228	0.043	**0.618**
Q15 Would you like to learn more about bears?	**0.555**	−0.420	−0.037	0.140	0.046
Q16 Have you (your family or relatives) ever had any damage caused by a bear?	−0.017	−0.068	−0.034	0.050	**0.660**
Q19 In your opinion, how should authorities deal with problem bears?	−0.032	**0.571**	−0.120	0.093	−0.052
Country	0.201	**0.738**	0.160	0.287	0.096
Respondent's age	−0.037	**−0.621**	0.172	0.199	0.079
Respondents gender	0.131	−0.096	**0.667**	−0.031	−0.269
Urbanization	−0.116	−0.121	0.307	**0.615**	0.240

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 16 iterations. Factor-related loadings shown in bold.

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