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Does Beauty Matter? The Effect of Perceived Attractiveness on Children's Moral Judgments of Harmful Actions against Animals

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Abstract

The current research asks whether children's judgments of harmful actions toward animals depend on animals' perceived attractiveness. In Study 1, primary school children ($N = 359$) rated the perceived attractiveness of six animals and judged how severe it is to hurt them, as compared to moral transgressions, social-conventional transgressions, and personal choices. Hurting attractive animals was perceived as severe as hurting another child, while hurting unattractive animals was evaluated as less serious than social-conventional transgressions. In Study 2, we experimentally tested whether the attractiveness of animals rated as unattractive in Study 1 could be influenced by an environmental education intervention. After the intervention, children in the experimental group ($N = 21$) rated unattractive animals as more attractive than before the intervention, and this led to judging harming these animals more severely than before the intervention. No changes were found in the control group ($N = 20$).

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Nature conservation broadly depends on the degree to which people decide to protect the environment (Evans, 2019; Lindemann-Matthies et al., 2010; Stokes, 2007). Decisions for conservation are influenced by multiple factors, including economic, cultural and ethical values of species (Balmford et al., 2002; Chapin et al., 2000; Edwards & Abivardi, 1998; Nelson et al., 2016; Saunders, 2003; Saunders et al., 2006). Nature has an aesthetic value (Balmford et al., 2002; Gobster et al., 2007; Tribot et al., 2018), which has been demonstrated to influence people's preferences for landscapes (Kalivodaa et al., 2014; Nohl, 2001), plants (Lindemann-Matthies et al., 2010) and animals (Gunnthorsdottir, 2001; Marešová et al., 2009). Scientific evidence also shows that this aesthetic value or perceived attractiveness influences people's attitudes toward animal conservation more strongly than objective characteristics such as the animal's ecological value, the International Union for Conservation of Nature (IUCN) status, or its usefulness to humans (Colléony et al., 2017; Gunnthorsdottir, 2001; Tribot et al., 2018). Positive evaluations of certain species based on affect-related factors, such as attractiveness, similarity to humans and charisma, influence the decisions toward conservation of the general public (Colléony et al., 2017; Martín-López et al., 2007) as well as that of policymakers (Knegtering et al., 2002; Marešová & Frynta, 2008; Metrick & Weitzman, 1996). This, in turn, has an impact on many species' survival prospects (Gunnthorsdottir, 2001; Stokes, 2007).

Nature conservation has long been thought to have moral roots, and individuals who believe that nature has a moral standing tend to behave in a pro-environmental way (Delaney & White, 2015; Harland et al., 1999; Thøgersen, 2006). Based on social domain theory (Smetana, 2006; Turiel, 2006), recent studies have examined whether children's evaluations of anti-environmental actions can be framed in moral terms (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Horvath, 2011). Their collective findings show that children as young as 3 years old include behaviors that harm the environment in their moral framework (Hahn & Garrett, 2017), and factors such as frequency of nature exposure (Collado & Sorrel, 2019), age (Hahn & Garrett, 2017) and the target of the action (Hussar & Harris, 2018) regulate children's moral judgments of environmentally harmful actions. For example, actions that harm animals tend to be judged more harshly than hurting plants/trees (Collado & Sorrel, 2019). We do not know, however, the factors leading

children to judge hurting some victims more seriously than hurting others. Could it be that harmful actions toward victims perceived as attractive are judged more harshly than those aimed at less attractive targets? Building upon research based on social domain theory, we expand on previous studies on children's environmental morality by examining whether the perceived attractiveness of an animal victim is associated with children's moral judgments of harmful actions directed to animals. Consistent with previous studies (Gunnthorsdottir, 2001; Huddy & Gunnthorsdottir, 2000), attractiveness is understood as the quality of attracting attention, interest, affection, and other pleasurable emotions.

Across cultures, both adults (Kellert, 1993a, 1993b; Samples et al., 1986; Ward et al., 1998) and children (Borgi & Cirulli, 2015; Snaddon et al., 2008; Torres-Merchan et al., 2018) prefer animals that are large and phylogenetically related to humans. This preference for high-order species emerges early in childhood (Borgi & Cirulli, 2015). Overall, mammals, birds, and fish are considered aesthetically pleasing (Czech & Krausman, 2001; Kellert, 1996; Lišková & Frynta, 2013) while reptiles, amphibians, and invertebrates are generally viewed with aversion and tend to elicit negative emotional reactions (Ballouard et al., 2012; Czech & Krausman, 2001; Kellert, 1993b; Knight, 2008). There are, however, some exceptions. Some insects, such as butterflies and dragonflies, are generally considered appealing (Lorenz et al., 2014; Torres-Merchan et al., 2018), while some mammals such as bats, are not (Knight, 2008). Characteristics related to the perception of attractiveness in animals include juvenile appearance, shape, body weight, color, type of locomotion, posture, and surface texture (Frynta et al., 2013; Kellert, 1996; Landová et al., 2018; Lišková & Frynta, 2013; Morris, 1967). Despite these generalizations, the bases of human aesthetic preferences for animals may differ across species (Stokes, 2007).

The aesthetical appreciation granted to some animals over others is associated with individuals' willingness to conserve them. People are more inclined to pay for the survival of more charismatic animals (Colléony et al., 2017; Martín-López et al., 2007), and are more willing to preserve those animals considered to be more attractive, even within the same species (Gunnthorsdottir, 2001). The effect of attractiveness on conservation behavior is unlikely to be explained, however, by a simple desire for aesthetics, and other factors might be behind people's more positive attitudes toward the conservation of attractive animals. The moral stand granted to animals might be among such factors. To our knowledge, there are no studies examining the possible link between animals' attractiveness and moral judgments of harmful actions against animals. We also do not know whether the positive link between perceived attractiveness and pro-environmentalism found in adults

holds for children. Given that environmental morality (Hahn & Garrett, 2017) and animal preferences (Borgi & Cirulli, 2015) develop at an early age, and that most environmental education programs are designed for children, in this study we examine whether children's moral judgments about harmful actions against animals are related to how attractive these animals are perceived.

Previous studies have shown that children view environmental behaviors in moral terms (Kahn & Friedman, 1995; Kahn & Lourenco, 2002; Howe et al., 1996), but it has been only recently when children's evaluations of actions that harm the environment have been analyzed from the perspective of the social domain theory (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Harris, 2018; Hussar & Horvath, 2011). Social domain theorists posit that children's moral reasoning can be classified into three domains, based on the target of the harmful action: (1) Moral transgressions (actions that inflict harm on another, physically or psychologically, e.g., insulting), (2) Social-conventional transgressions (actions that interfere with the social order, e.g., not sitting in the assigned place), and (3) Non-harmful personal choices (e.g., eating carrots for snack) (Smetana, 2006; Smetana et al., 2014; Turiel, 2006). Children typically judge moral transgressions as very bad, consider social-conventional transgressions to be less serious, and pass no judgment on personal choices (Smetana, 2006; Smetana et al., 2014; Turiel, 2006). From this theoretical framework, different studies have examined whether children assess environmentally harmful behaviors similarly to moral transgressions, social-conventional transgressions, or personal choices (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Horvath, 2011).

According to Hahn and Garrett (2017), preschoolers (3–5 years old) view damage to the environment as a moral issue, but only 3-year-olds considered environmental harm as harsh as harm to other children. Hussar and Horvath (2011) found that children aged 6- to 10-year-old judge behaviors that harm the environment as morally wrong, but harm to other people was more severely judged than damage to the environment. Their results also show that children judged environmentally harmful actions more severely than social-conventional transgressions. Participants in both studies tended to pass no judgment on personal choices.

In the above-mentioned studies, harm to the environment did not have a specific victim, which might explain why, from the age of four, children did not consider environmental harm as severe as harm to others. In a more recent study, Collado and Sorrel (2019) examined whether how harshly children judged different environmentally harmful actions depended on the victim. The authors included in their study environmentally harmful actions directed to animals, to plants/trees, and actions with no specific victim (e.g., failing to recycle), and compared these to the three classical social domains (moral

transgressions, social-conventional transgressions and personal choices). In line with previous studies (Hahn & Garrett, 2017), their findings show that children rated environmentally harmful actions without a specific victim as more morally wrong than actions that infringe social norms and non-harmful personal choices. Children judged hurting animals more severely than hurting plants/trees, and these judgments varied according to children's exposure to nature. Children who frequently spend time in nature considered hurting an animal as severe as moral transgressions. However, for children whose contact with nature is scarce, hurting animals fell between the moral and social-conventional domains. Interestingly, children perceived social transgressions as worse as hurting plants/trees, independently of their frequency of contact with nature.

Studies focused exclusively on animals as the victim of harmful actions show that the severity with which children judge such actions depends on the target animal (Dunlap, 1989; Hussar & Harris, 2018; Kellert, 1984). The limited studies conducted in this realm show that children's moral reasoning about animal suffering is more sophisticated when the victim is an animal to which the participant feels emotionally or phylogenetically close (Dunlap, 1989; Kellert, 1984). Based on social domain theory, Hussar and Harris (2018) examined how 7- to 10-years-old children judged physical attacks to three different types of animals: pets, farm animals, and wild animals, and compared these to hurting another child. Their findings show that children judged harm against pets as the most severe, followed by hurting wild animals and hurting farm animals, while attacks against humans were perceived as the less severe. Their results are in agreement with those of previous researchers suggesting that animals' affect-related characteristics, such as emotional closeness, interest and awe, influence the moral stand children grant to animals (Dunlap, 1989; Kellert, 1984). They also support the idea stated by social domain theorists of children's judgments about harmful actions depending on the identity and characteristics of the victim (Smetana, 2006).

In the present research, we move a step further in the study of the factors regulating children's sense of morality toward the natural world by examining whether an animal affect-related characteristic, namely perceived attractiveness, relates to children's judgments of harmful actions to animals. We aim to answer the following questions: (1) Do children's moral judgments of harmful actions toward animals vary according to the perceived attractiveness of the victim? (2) Can participation in an environmental education (EE) program influence how attractive children perceive animals? And (3) Is this shift in perceived attractiveness related to the severity with which children judge hurting animals? To answer these questions, we conducted two consecutive studies.

In Study 1 we explored the possible influence of the perception of animals' attractiveness on children's moral judgments about actions against animals. Children's evaluations of harmful actions directed to attractive and unattractive animals were compared to how children judge actions included in the three classical domains of social domain theory. Hence, we had five behavior types: hurting attractive animals, hurting unattractive animals, moral transgressions, social-conventional transgressions, and personal choices. We expect that some animals will be perceived as more attractive than others. Specifically, in line with previous studies (Czech & Krausman, 2001; Kellert, 1993b, 1996; Knight, 2008; Lišková & Frynta, 2013; Torres-Merchan et al., 2018), squirrel, bird, and butterfly are expected to be perceived as more attractive than bat, moth, and ant (Hypothesis 1.1, H1.1). Children tend to attribute human characteristics to animals (i.e., anthropomorphize them). This process leads them to grant animals a moral value, conceiving them as creatures capable of suffering (Ganea et al., 2014), enhancing feelings of empathy (Chan, 2012; Lorimer, 2007) and motivating conservation actions (Root-Bernstein et al., 2013). Children conceive animals that are typically anthropomorphized as deserving the same moral consideration as humans (Kahn, 2006). However, not all animals are equally anthropomorphized. Anthropomorphism is more frequent among animals that are more similar to humans, pets, and other charismatic or attractive animals, such as birds and butterflies (Ganea et al., 2014; Root-Bernstein et al., 2013). Thus, we expect children to evaluate harmful actions against attractive animals as severely as hurting other children (i.e., moral transgressions) (Hypothesis 1.2, H1.2). Harmful actions against unattractive animals are expected to be judged less harshly than hurting another child (i.e., moral transgressions) and than hurting attractive animals (Hypothesis 1.3, H1.3). Moral and animal transgressions (both for attractive and unattractive animals) are expected to be seen as more severe than disrupting the social order (i.e., social-conventional transgressions) and personal choices (Hypothesis 1.4, H1.4).

One efficient way to redress the attitudinal and conservational bias toward some (presumably more attractive) animals is through EE (Ballouard et al., 2012). In the second study (Study 2), we conducted a randomized experiment in which we tested whether children's aesthetic perception of animals, as well as moral evaluations of harmful actions directed to animals, could be influenced by an EE program. We designed a short EE intervention aimed at increasing children's perceived attractiveness. Our expectation is that, after participation in the EE program, children in the experimental group (those who participated in the program) will perceive unattractive animals as more attractive (Hypothesis 2.1, H2.1). We also hypothesize that, after the

program, children in the experimental group will consider harmful actions against unattractive animals as more severe than before participating in the program (Hypothesis 2.2, H2.2). We believe that animals' attractiveness and the severity with which children judge harmful actions against them will remain the same across time for the control group (children who did not participate in the program). For comparison purposes, moral transgressions, social-conventional transgressions and personal choices were also evaluated. The intervention is expected to have no effect on any of them.

Study 1

Method

Participants. Participants were 359 children (186 boys, 173 girls). They were between 8 to 12 years old ($M = 9.84$, $SD = 1.20$). Children were recruited from a mid-sized metropolitan Spanish area through state schools and none of them were vegetarian. Most of them were Spaniards (98.3%), but there were also students from other nationalities: China (1), Colombia (1), Morocco (1), and Dominican Republic (2). Two of the 359 respondents had missing values. We could not compute some of the scores for these two individuals, but used the information they provided whenever possible.

Stimuli and Instruments

Stimuli. Similar to previous studies (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Harris, 2018; Hussar & Horvath, 2011), children were presented with different hypothetical situations in a pictorial way (color cards of children doing different actions sized 14 cm × 11 cm) and asked whether the situations presented were "ok" (coded as 1), "a little bad" (2) or "very bad" (3). The pictures included a caption that described the illustrated action. The child's gender was paired with the child in the picture (Figure 1). The drawing represented five types of behaviors, with three actions per type of behavior (Appendix A): (1) Moral transgressions whose victim is another child (2); transgressions of social-conventions; (3); harmful actions to attractive animals (e.g., throwing pebbles at a squirrel) (4) harmful actions to unattractive animals (e.g., crushing a moth) and (5) non-harmful personal choices.

We pre-selected eight animals, four to be included in the attractive category and four in the unattractive category. To do this, we first conducted a literature review. Previous studies have shown that animals that are bigger and those more similar to humans are usually the most preferred (Gunnthorsdottir, 2001; Landová et al., 2018). To minimize the preference bias toward bigger, more human-like animals, all the animals included in the

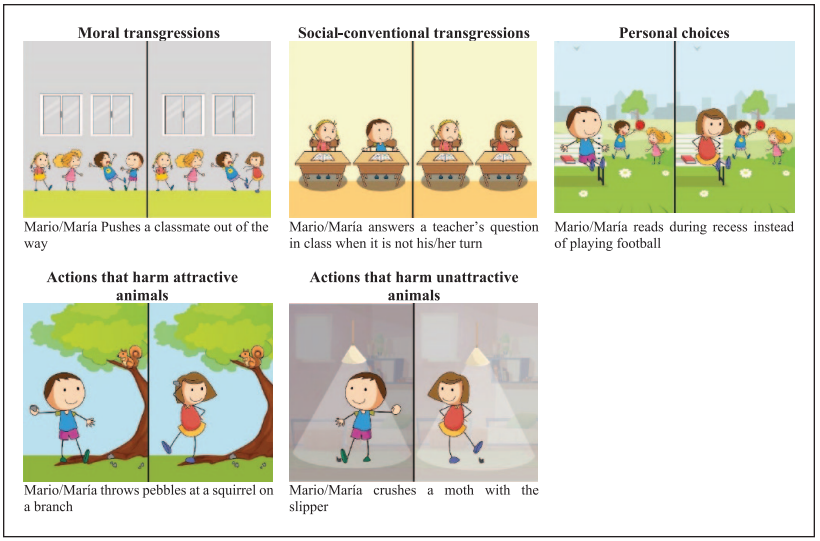

Figure 1. Example of pictures representing each of the five behavior types.
Note. Left drawing used for males and right drawing for females.

study are small. Children's emotional closeness to pets usually leads them to judge harmful actions against pets more harshly than actions that harm non-pet animals (Fonseca et al., 2011; Hussar & Harris, 2018). Because of this, none of the animals included in the study are typically pets in the Spanish context. As indicated in the introduction, mammals, fish and birds are usually preferred over insects and reptiles (Borgi & Cirulli, 2015). Condering this, the four pre-selected animals to be included in the attractive category were bird, squirrel, butterfly and rabbit, and the four to be included in the unattractive category were ant, moth, bat, and rat. The attractive group of animals included mammals (squirrel and rabbit) and a bird. We also included a butterfly because, although it is an insect, it is usually placed among the most attractive animals (Borgi & Cirulli, 2015; Manezi et al., 2015). The unattractive group of animals included two insects (moth and ant) commonly seen in Spain and two mammals (bat and rat). In Spain, none of these unattractive animals is dangerous to humans. Even though bats are mammals, they are usually perceived as unattractive (Borgi & Cirulli, 2015; Frynta et al., 2013; Knight, 2008), as well as rats (Bjerke et al., 1998; Landová et al., 2018).

After this pre-selection, we had a meeting with two experienced primary school teachers in which we discussed the animals to be finally included in the study, as well as the actions against them. The teachers believed that the

rat should be removed from the unattractive group given that children have less contact with it than with bats. Bats are very often seen in Spain, especially during summer nights. They can fly relatively close to people, it is commonly known that they feed on insects, and that they are harmless. Rats, however, are less often seen. Teachers also suggested eliminating the rabbit from the attractive group because some children could consider them as pets, even though, as indicated, rabbits are not common pets in Spain. Thus, each category finally included three animals.

Attractiveness Scale. The attractiveness scale designed by Gunnthorsdottir (2001) was used. The original scale is composed by 12 items measuring the extent to which an animal possesses various aspects of attractiveness (cute, nasty, dangerous, beautiful, repulsive, obnoxious, cuddly, dirty, friendly, hostile and nice), and demonstrated good psychometric properties (Cronbach's alpha = 0.89). For this study, the scale was back-translated into Spanish and pilot-tested with 7 to 12-year-olds ($N = 17$) to verify its understandability. In the pilot test, children rated the attractiveness of a squirrel and a moth in a 5-point Likert response scale (1 = completely disagree; 5 = completely agree). The pilot test showed that children had trouble conceiving animals with a small size, such as the ones used in this study, as "majestic". This was the only item with missing values and the interviews conducted with the participants after they had filled out the questionnaire revealed that they had trouble comprehending this item. Thus, "majestic" was not included in the scale used in the present study. We checked that the factor loadings were stable after removing this item with the data from Study 1. In Studies 1 and 2, each child filled this scale six times, one per animal (i.e., squirrel, butterfly, bird, bat, moth, and ant). Average Cronbach's alpha across the six animal-versions in this study was .83. (and .81 and .79 in Study 2 at times 0 and 1, respectively).

Procedure. Data were collected in children's schools, within school hours. Parents of children in fourth, fifth and sixth grade received an informed consent letter from the school, and were asked to sign it and return it to their child's teacher if they authorized their child to participate in the study. Eighty-one percent of the parents authorized their children to participate. Child assent was also obtained. Data collection had two phases. In the first one, participants were told that we wanted to know their opinion about different actions. Then, the researcher showed each hypothetical situation to the child and read the description of the action depicted on the card aloud. This was done through an individual interview that lasted an average of 15 minutes. The second phase of data collection took part 10 days after the interviews finished. Participants were given a pen and pencil questionnaire with the

attractiveness scale. Then, a power point presentation with images of each of the animals (one image per animal) was depicted in front of the class, and participants rated the animals' attractiveness. This phase lasted an average of 15 minutes. In both phases, students were assured that there were no wrong answers.

Data Analyses. Descriptive statistics, Cronbach's alpha, and score distribution plots were generated using the psych (Revelle, 2018) and ggplot2 (Wickham, 2016) packages of R (R Core Team, 2018). In order to explore possible differences in the dependent variables (i.e., attractiveness and severity) across the groups, a paired sample *t*-test followed by a series of repeated measures ANOVAs were conducted using SPSS 23 (IBM Corp, 2015). Partial eta-squared was computed to evaluate the relevance of significant differences. These effect sizes values were described following Cohen (1988)'s guidelines, which consider effect sizes in the [0.01, 0.06), [0.06, 0.14), and [0.14, ∞) intervals to be small, medium, and large, respectively. Unless otherwise indicated, the observed power in the ANOVAs was approximately higher than 0.80. Higher-order interactions in the ANOVAs were further analyzed using post-hoc tests and confidence intervals (C.I.) with Bonferroni correction to correct for multiple testing (i.e., p adjusted to .05/M, where M denotes the number of comparisons).

Results

The descriptive information for the attractiveness scores across the six animals can be seen in Figure 2. As can be observed from the figure, bird (M=4.21), butterfly (M=4.02), and squirrel (M=3.81) obtained higher attractiveness means than moth (M=2.85), ant (M=2.61), and bat (M=2.53). We created two groups of animals based on the perceived attractiveness results (attractive and unattractive). In order to check H1.1, we conducted a paired sampled *t*-test to explore if the attractiveness mean score of the attractive animals (bird, butterfly, and squirrel) was significantly higher than the attractiveness mean of the unattractive animals (moth, ant, and bat) . The dependent variable (DV) was the attractiveness mean score and the independent variable (IV) was the animal group. The t-test results indicated a significant difference (t (356)=34.28, $p < .001$). Cohen's d showed that this effect was large (d=1.81 which corresponds to $\eta_p^2 = .45$).

Next, we explored to what extent harmful actions against animals perceived as more attractive were judged differently than those against less attractive targets, and compared these to the severity with which children judge actions in the three classical social domains (H1.2, H1.3, & H1.4). The

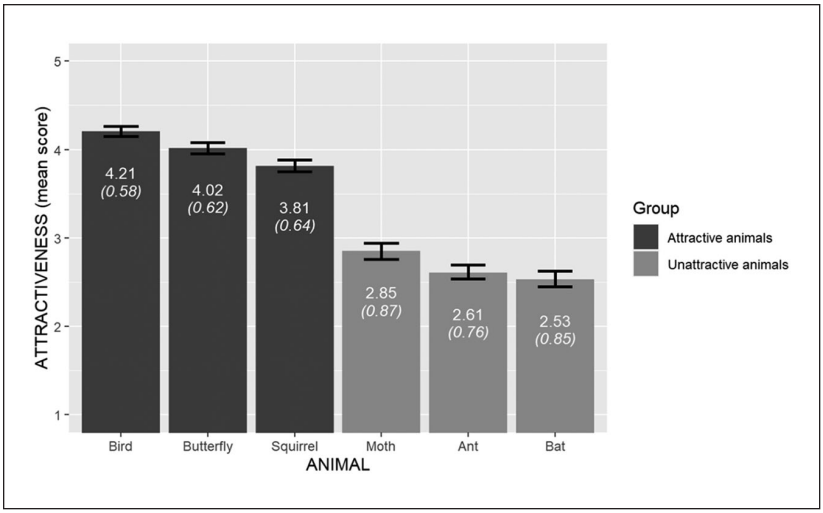

Figure 2. Attractiveness mean scores and 95% CI according to animal.
Note. The mean (and standard deviation) are indicated within each bar.

severity with which children judged harmful actions against the animals within each group was very similar [mean scores were: attractive animals: 2.83 (bird), 2.75 (butterfly), and 2.89 (squirrel); non-attractive animals: 2.16 (moth), 2.14 (ant), and 2.19 (bat)]. It was notable that the variability in the scores of the unattractive animals was generally greater [SDs were = 0.67 (moth), 0.61 (ant), and 0.70 (bat)] than for the attractive animals [SDs were = 0.41 (bird), 0.48 (butterfly), and 0.31 (squirrel)], which may be indicative of some ceiling effect for the animals in the attractive group. Nonetheless, in both cases there was always some variability in the responses. Following the approach of previous researchers (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Horvath, 2011), the scores of each of the actions within each group were averaged. This same procedure was followed for the actions included the moral and social-conventional transgressions, as well as for those included in personal choices (i.e., the severity scores for the three actions was averaged to create a single score).

Figure 3 depicts the distribution of the severity mean score across the five behavior types (i.e., attractive animals, unattractive animals, moral transgression, social-conventional transgressions, and personal choices). Children judged harmful actions against attractive animals and against other children as the most severe ($M = 2.82$ and $M = 2.76$, respectively), followed closely by actions that disrupt the social order ($M = 2.57$). Children judged harmful

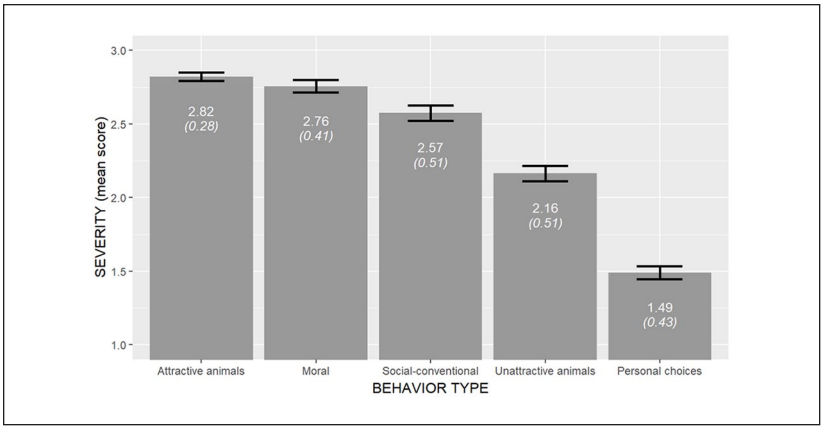

Figure 3. Severity mean scores and 95% CI according to behavior type.
Note. The mean (and standard deviation) are indicated within each bar.

actions against unattractive animals as a little bad ($M = 2.16$) and tend to pass no judgment on personal choices ($M = 1.49$). To check H1.2, H1.3 and H1.4, we conducted a one-way repeated measures ANOVA to explore if these means significantly differed from each other. The dependent variable (DV) was the severity mean score and the independent variable (IV) was the behavior type. The ANOVA results indicated a significant effect of behavior type ($F(3.61) = 598.47, p < .001$). Partial eta-squared indicated that this effect was large ($\eta_p^2 = .63$). The post-hoc analysis revealed that all the one by one comparisons were significant, with the exception of the comparison between hurting attractive animals and moral transgressions ($p = .17$). That is, the severity with which children judged each of the five behavior types differed from each other, with the only exception of harmful actions against attractive animals and harmful actions against other children.

According to the results of this first study, children perceive some animals as more attractive than others. Specifically, bird, butterfly and squirrel were rated as more attractive than bat, moth and ant. Also, the extent to which an animal is perceived as attractive is related to how harshly children judge actions that hurt the animal. In Study 2 we examined the effect of an EE intervention aimed at increasing the perception of attractiveness of animals classified as unattractive in Study 1. Specifically, we checked whether participation in the EE program would enhance perceived attractiveness of unattractive animals and, in turn, increase the severity with which children judge actions that hurt those animals.

Study 2

Method

Participants. Forty-one Spanish children (23 boys, 18 girls; from 9 to 10 years old, M age = 9.66, SD = 0.73) from the same region as those in Study 1 participated in the study. Data were collected in a state school. Parental authorization and child assent were obtained. No child in Study 2 had also participated in Study 1, and none of the participants were vegetarian. Two school classes were randomly assigned to the experimental (N = 21) and waitlist control (N = 20) groups. The two groups were balanced in terms of children's age and gender distribution. School classes had not been created following any arbitrary criteria relevant to the intervention program. In Spain, children are generally assigned to state schools according to where they live (i.e., parents cannot decide to what state school their children will go). This means that children usually share a similar socio-economical background. Hence, although the students in the experimental group and the control group were directly grouped by class, since these two classes belong to a state school and were parallel classes, these students can be considered as random grouping to a certain extent. There were no missing values. Considering the large effect size estimates obtained in Study 1, this sample size should be sufficient to have a large statistical power to detect whether the intervention program had a significant impact on children's perceptions of animals' attractiveness and severity judgments.

Stimuli and Procedure. The study followed a pre-post experimental design. It consisted of three phases: (1) Data collection 1 (T0, pre-intervention), (2) EE intervention and (3) Data collection 2 (T1, post-intervention). The same stimuli and instruments used in Study 1 were employed in both data collections. Two research assistants collected the data at T0 and T1, and they were blinded to participants' conditions. These researchers did not collaborate in the intervention phase.

Pre-Intervention Data Collection (T0). For the first data collection, participants rated the same six animals included in Study 1 in terms of perceived attractiveness, and judged the severity of harmful actions directed to them. The procedure followed was similar to the one described in Study 1.

EE Intervention. Previous studies have shown that getting to know animals better, for example by learning about how animals behave and react toward different situations, their habitats and their relationship with other animals as well as with humans helps to develop a sense of empathy toward

them (Candea, 2010; Root-Bernstein et al., 2013), and to shift children's attitudes toward less appealing animals from negative to more positive ones (Ballouard et al., 2012; De Pinho et al., 2014). Learning about the animal's lifestyle also leads to perceiving such animal as more attractive (Gunnthorsdottir, 2001). Given that negative attitudes toward some animals, such as low preference, disgust and fear, are affected by children's biological illiteracy (Ballouard et al., 2012; Borgi & Cirulli, 2015), we conducted an EE program in which children in the experimental group learned about the three animals rated as unattractive in Study 1 (i.e., bat, moth, and ant). The program consisted of three, fifty-minute long sessions that took place within the same school week. Three times a week, during the science class, children received information about the three animals (one animal per session). The science teacher, with the help of a researcher assistant trained for the purpose of the study, explained the lifestyle of each of the three animals (e.g., what they do, where they live, what they eat, how many progenies they have, and the fact that they are inoffensive to humans). Once the students had learned about an animal, children were given 3 minutes to draw a picture of the animal. During the EE intervention the teacher and the researcher carefully avoided saying that the animals should be protected. Thinking about the animals' feelings was not prompted. During the same three sessions, children in the waitlist control group learned about the diversity of Spanish landscapes and received the EE program 2 weeks later.

Post-Intervention Data Collection (T1). The second data collection followed the procedure described in the pre-intervention. The day after the EE intervention finished, students collectively rated the attractiveness of the six animals. Individual interviews were also conducted to examine how children judged the severity of harmful actions against the animals.

Data Analyses. We conduced a repeated measures ANOVAs to compare possible differences in terms of attractiveness and severity between the experimental and control groups across time. Thus, the group variable was included as a between-subject factor, and time (T0: Pre-intervention and T1: Post-intervention) as a within-subjects factor.

Results

In order to check whether the attractiveness of animals perceived as unattractive in Study 1 increased after the EE (i.e., H2.1), we first explored the distribution of the attractiveness sum score across the six animals and time (Figure 4). Congruently with what was found in the previous study,

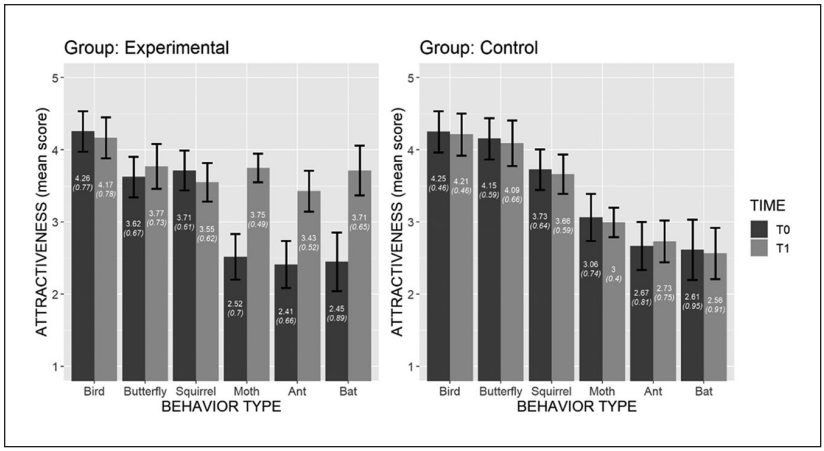

Figure 4. Attractiveness mean scores and 95% CI according to animal (*x*-axis), time (color), and group (grid).
Note. The mean (and standard deviation) are indicated within each bar. Animals are decreasingly ordered based on their means in Study 1. T0 (dark gray): Pre-intervention; T1 (light gray): Post-intervention.

children in the control group rated squirrel, butterfly and bird as more attractive than bat, moth and ant, both at T0 and at T1. Similar results were obtained in the experimental group at T0. However, after the EE intervention (T1), children in the experimental group rated unattractive animals as more attractive than at T0. We then conducted a three-way repeated measures ANOVA to explore if these attractiveness means significantly differed. The DV was the attractiveness mean score and the IVs were animal, time (T0, T1), and group (experimental, control). Animal and time were repeated measures variables. The three-way interaction was significant ($F(3.28) = 8.52$, $p < .001$). Effect size was large ($\eta_p^2 = .18$). To interpret this interaction, Bonferroni correction was applied to correct for multiple testing in a post-hoc analysis. The post-hoc multiple comparison analysis revealed that the only significant differences were found for the three unattractive animals (i.e., bat, moth, and ant) across time and just in the experimental group. Hence, the EE intervention enhanced the perceived attractiveness of the three animals previously classified as unattractive. All the other comparisons were non-significant.

Next, we moved to H2.2, and examined the severity with which children judged the actions that hurt attractive and unattractive animals, between groups and across time. We considered the same behavior types as the ones

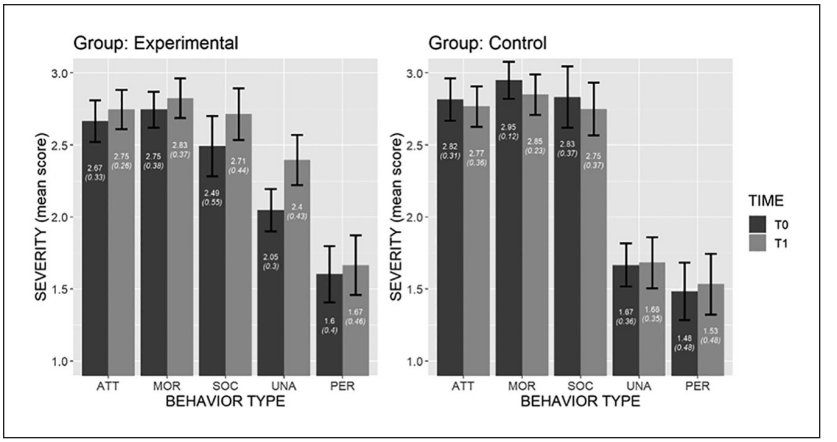

Figure 5. Severity mean scores and 95% CI according to domain (*x*-axis), time (color), and group (grid).
Note. The mean (and standard deviation) are indicated within each bar. Domains are decreasingly ordered based on their means in Study 1. T0 (dark gray) = pre-intervention; T1 (light gray) = post-intervention; ATT = attractive animals; MOR = moral, SOC = socialconventional; UNA = unattractive animals; PER = personal choices.

included Study 1 (i.e., hurting attractive animals, hurting unattractive animals, moral transgressions, social-conventional transgressions, and personal choices). Figure 5 depicts the distribution of the severity mean scores across the five behavior types, time (T0, T1), and group (experimental, control). Overall, across all the IVs, severity means were higher for moral transgressions (2.84, $SD = 0.30$), hurting attractive animals (2.75, $SD = 0.32$), and social-conventional transgressions (2.70, $SD = 0.45$), followed by hurting unattractive animals (1.96, $SD = 0.47$) and personal choices (1.57, $SD = 0.45$). We then conducted a three-way ANOVA including severity as dependent variable and behavior type, time, and group as independent variables. Behavior type and time were repeated measures variables. We expected significant differences in the severity with which children judged harmful actions to unattractive animals across time (i.e., between T0 and T1), but only for children in the experimental group (H2.2). Our findings aligned with this expectation. Specifically, the three-way interaction was not significant ($F(2.78) = 0.784$, $p = .50$). The observed power was low (.26). This non-significant result indicates that most means did not significantly differ between groups and across time, in accordance with our expectations. The post-hoc analysis showed significant differences when comparing the severity mean of hurting unattractive animals at T0 and that same mean at T1 for the

experimental group ($p < .001$). No other significant differences were found. This implies that the severity mean for hurting unattractive animals after the intervention (2.40) was significantly higher than the mean before the intervention (2.05).We next examined the time × group interaction for the only behavior type that involved the animals addressed in the intervention program (i.e., unattractive animals). We found that the two-way interaction was significant ($F(1) = 7.97$, $p = .007$). The effect size was large ($\eta_p^2 = .18$). This shows that the difference between the pre-post scores for the severity with which children judge actions that hurt unattractive animals is statistically larger in the experimental group (2.40 vs. 2.05) than in the control group (1.67 vs. 1.68).

Discussion

In the present study, we extended from previous research examining children's moral environmental judgments from the perspective of social domain theory (Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar & Harris, 2018; Hussar & Horvath, 2011) and examined whether children's evaluation of harmful actions toward animals differed according to how attractive the animals were perceived. As a reference point, these judgments were compared to the three classical social domains (i.e., moral transgressions, social-conventional transgressions, and personal choices). In addition, we examined whether an environmental education intervention could influence children's perceived attractiveness of less attractive animals and if this, in turn, led to evaluating hurting such animals as more morally wrong.

In line with our first hypothesis (H1.1) and with previous research about human preferences for animals (Czech & Krausman, 2001; Kellert, 1993a, 1993b, 1996; Knight, 2008; Lišková & Frynta, 2013; Torres-Merchan et al., 2018), squirrel, bird, and butterfly were perceived as more attractive than bat, moth, and ant. As expected (H1.2 & H1.3), children evaluated hurting attractive animals as equally wrong as hurting another child, and hurting unattractive animals was judged less severely. In accordance with social domain theory (Smetana, 2006), findings from Study 1 show that actions against another child were perceived as worse than social-conventional transgressions, and children tended to pass no judgment on personal choices. Interestingly, hurting unattractive animals was perceived as less serious than disrupting the social order. These results partly support hypothesis 1.4, as we expected children to judge hurting both attractive and unattractive animals more harshly than social-conventional transgressions. These findings were replicated in our second study with a different sample of children. According to our results, the severity with which children judge actions that harm

animals with respect to the three classical social domains is associated with how attractive animals are perceived. In other words, perceived attractiveness influences the moral stand that children grant to animals.

In our second study, we checked whether this bias toward more attractive animals could be shifted by an EE intervention. Given that children show negative attitudes, such as disgust or low preference, toward less charismatic animals (Ballouard et al., 2012; Borgi & Cirulli, 2015; Fonseca et al., 2011) and that learning about these animals increases how attractive they are perceived (Gunnthorsdottir, 2001), the EE intervention included in our second study was designed to fight children's illiteracy about unattractive animals. In line with our hypotheses (H2.1. & H2.2), children who took part of the EE intervention perceived unattractive animals as more attractive after the program and judged harmful actions against them more severely than before the program. As expected, animals' attractiveness and the severity with which children judged harmful actions against them remained the same across time for the control group. The intervention did not affect how children judged actions within the three classical social domains (moral transgressions, social-conventional transgressions, and personal choices). This provides additional support to the fact that the EE intervention was the factor that caused the increases found in terms of attractiveness and severity in the experimental group.

The results of the two studies support those of previous researchers indicating that children condemn harm to animals and view actions against some (more attractive) animals as moral transgressions, which are defined as harm caused to another (Smetana et al., 2014; Turiel, 2006). In agreement with Hussar and Harris' (2018) suggestion, this could indicate that the "other" references in the moral transgression definition can be extended to, at least, some animals. Hurting unattractive animals fell, however, between the social and personal domains. Children's social interactions may be responsible for these results. Social domain theory (Smetana, 2006; Turiel, 2006), proposes that morality is constructed out of reciprocal individual-environment interactions. These include direct interactions with the victim of transgressions, and indirect ones through, for instance, the feedback received from others, mainly from parents, but also from peers, teachers and the media. Children are frequently exposed to anthropomorphized representations of the animals included in the attractive animals' category through, among others, children's exercise and storybooks, films and everyday language (Geerdts, 2015; Wagler, 2010), and it is less common to see anthropomorphized images of unattractive animals (Root-Bernstein et al., 2013). Children usually show empathic feelings toward anthropomorphized animals, take their perspective, feel more connected to them, and grant them the capacity to suffer and feel

pain (Tam et al., 2013). As Smetana (2006) points out, these affective reactions are highly correlated with judgments of moral events. In line with our findings, this would lead children to conceive anthropomorphized animals as moral objects (Ganea et al., 2014) and, as such, to evaluate hurting them as morally wrong. As a result, some conservationists encourage the use of anthropomorphism as a conservation tool and call for the development of anthropomorphic meanings around, a priori, less appealing species (Root-Bernstein et al., 2013; Tam et al., 2013).

Based on social domain theory (Smetana, 2006), another reason why children might grant a different moral stand to attractive and unattractive animals is because of the feedback received from others about the effects of acts on animals' welfare. Given adults' biased preference for some animals over others (Colléony et al., 2017; Gunnthorsdottir, 2001; Tribot et al., 2018), it is plausible that children are more frequently told about the negative consequences that human acts have for charismatic species than for less appealing ones. Children might acquire this information from their parents, but also at school and from participation in EE programs. For example, Wagler (2010) found that teachers' attitudes toward specific animals are strongly associated with their likelihood to include or exclude that animal from their future science curriculum. Also, most EE interventions focus on charismatic species, leaving aside a wide range of species, such as most invertebrates, that tend to be less attractive to people (Ballouard et al., 2012; Gunnthorsdottir, 2001). As a consequence, children acquire knowledge and receive feedback about the consequences of human actions on a limited number of animals, which might prompt them to judge hurting such animals more harshly than harmful actions against less attractive ones.

As indicated above, children assessed disrupting social norms as worse than hurting unattractive animals. Our interpretations of this finding also relate to the feedback children receive from others. It is likely that adults' negative emotions toward less attractive animals (Kellert, 1993b) minimize the number of times adults talk to children about the negative consequences that human actions have on them. In contrast, children are often told about the consequences of disrupting the social norm. Hence, it is plausible that children's socially-based knowledge about harming less attractive animals, such as ants, is more limited than socially-based knowledge about the disruption of social norms. Research is needed to explicitly check these hypothesized connections between patterns of social interactions and the development of moral and social judgments. Attention should be paid to, for instance, the possible influence of parental views of unattractive animals on their children's environmental moral framework.

Our findings have implications for nature conservation. The two studies presented here show that children perceive animals to have a moral stand, although to a different degree, depending on the attractiveness of the animal. Our findings show that EE interventions aimed at fighting children's illiteracy about unattractive animals increase animals' attractiveness, and lead children to evaluate harming less attractive animals more seriously. These conclusions are based on the findings of an experiment and hence allow us to be quite confident about the positive effect that an EE intervention has on children's perceptions of animals' attractiveness and moral development. According to our findings, an increased understanding of unattractive animals' lifestyle, including how they behave, what they eat, and their relations with other animal species helps develop a more empathetic view toward them. Future research with additional experimental conditions (e.g., learning about the animals' lifestyle vs. learning about the animals' relation to humans) will shed some light on what specific elements of the EE intervention lead to an increased sense of morality toward animals. The possible mediating role of enhanced animals' literacy on the relationship between participating in the EE program and increased attractiveness should also be considered. Measuring children's animal literacy before and after the intervention will add to this realm.

Tackling attractiveness in EE interventions is especially relevant for those animals that, according to their scientific characteristics (such as their IUCN conservation status), need preservation but might not be very attractive to children. Educators could focus on regulating how children perceive endangered animals in terms of attractiveness and other affect-related characteristics. This might be done by providing children with indirect and vicarious experiences with the animals through, for instance, EE programs, documentaries and books (Kellert, 2002). An enhanced sense of morality toward unattractive animals is likely to prime children's conservation support and behaviors (Krettenauer, 2017). A fruitful line for future research is the evaluation of how the moral stand children grant to animals translate into conservation behavior. It is also worth examining the possible intergenerational transmission of positive attitudes toward less attractive animals acquired via EE programs from children to parents (Ballanty et al., 2010; Collado et al., 2019).

Our study has some limitations that set the basis for future lines of research. First, we exclusively focused on children's moral judgments of harmful actions against different types of animal victims, but we did not consider other relevant aspects of children's morality. Social domain theory proposes that, apart from being assessed more severely than other transgressions, moral transgressions are hypothesized to be obligatory, universally

applicable, impersonal, and normative binding (Smetana, 2006). Thus, our research constitutes a first step in the study of children's morality toward animals. Given that assessments of the seriousness of actions that hurt different animals vary depending on animals' affect-related characteristics, it is necessary to examine whether the criteria for morality are met for every animal or, as suggested by the results presented here, these criteria might be met only by some, more attractive, animals. For instance, would hurting a bird at home, at school, or in another country be perceived as equally wrong? And would these same criteria apply to hurting a bat? Also, we do not know children's justifications for their judgments, and these should also be considered in future studies. The reasoning behind children's assessments will probably shed some light up to whether children consider the intrinsic consequences of acts for attractive animals (i.e., provide moral justifications) but are more inclined to justify their assessments of hurting unattractive animals in terms of authority (e.g., rules), social expectations or even personal choices. Another interesting research question is whether an EE program can help unattractive animals meet the criteria to be considered moral objects and, as such, be perceived as having an intrinsic or biocentric value.

Second, following the protocol used in previous research, the actions included in the study related to physically hurting animals (Hussar & Harris, 2018) and were distinct among the different animals, and also different from the actions that harm other children (Collado & Sorrel, 2019). These actions were chosen after several meetings with primary school teachers aimed at creating a pool of harmful actions against animals that were more frequently conducted by 9 to 12-year-olds. For these specific animals, the actions chosen were the ones that made more sense to the teachers, but this implied that actions differed across animals. For instance, it would not be that common to "through pebbles" (the action chosen for the squirrel) at an ant. To further extend our knowledge about the influence of type of victim on moral evaluations, future studies should try to include the same action (e.g., kicking) for all the victims, including human ones. This will probably help us understand whether our findings are caused by the animal suffering the action and not by the action in question. It should also be noted that the item "majestic" was eliminated from the *attractiveness* scale because children had difficulties understanding its meaning when used to refer to the animals evaluated in our studies. This item might provide valuable information in future research including animals with other characteristics (e.g., bigger).

Third, although the sample included in Study 2 conferred sufficient statistical power to detect effects, it is not large, and results in both studies are limited to primary school children from a specific area in Spain. This precludes the generalization of the findings. Further studies with a more diverse

sample of children from different regions, cultures, socio-economic backgrounds, and ages are needed to replicate the results. For example, social domain theory posits that moral reasoning changes through the lifespan. Children as young as 3 years old are able to rudimentarily distinguish moral and social-conventional transgressions, especially when evaluating familiar events (Smetana, 2006). This distinction becomes more reliably and extends to a larger range of events as children grow up. Previous studies have uncovered age differences in children's evaluations of environmentally harmful actions (Collado & Sorrel, 2019; Hahn & Garrett, 2017). Three-year-olds tend to evaluate harm to the environment as equally wrong as harm to another child, but by the age of four, children judge hurting another person more seriously than harming the environment (Hahn & Garrett, 2017). Collado and Sorrel (2019) found that 7 to 9-year-olds showed a stronger sense of environmental morality than 4 to 6-year-olds and pre-adolescents. Developmental shifts in children's evaluations of actions hurting attractive and unattractive animals might also exist, especially considering that children tend to anthropomorphize animals until the age of 12. Would this lack of anthropomorphized representations of animals from adolescence lead to granting animals a different moral stand? And, considering that moral reasoning is more sophisticated as children grow up, would adolescents include unattractive animals in their moral framework? Cultural variations in children's judgments of harmful actions against animals should also be considered. The perception of some animals differs across cultures and this might influence the moral status children grant them (Lee, 2012). For instance, Japanese identify bears as devils and criminals and believe that they should be executed (Knight, 2000). This perception might lead Japanese children to judge hurting bears less seriously than would children from a culture with a less negative representation of bears.

To conclude, given that the survival of endangered species largely depends on individuals' pro-environmental attitudes and behaviors (Evans, 2019; Rands et al., 2010; Rodrigues, 2006) it is essential to understand the factors influencing the development of a sense of environmental morality (Collado & Sorrel, 2019; Hahn & Garrett, 2017). Our findings show that perceived attractiveness plays a role in children's moral judgments of actions against animals. Hurting attractive animals was assessed more severely than hurting unattractive ones. These results align with previous research showing the conservation bias in favor of more appealing animals (Colléony et al., 2017; Lorenz et al., 2014), which risks the survival of many endangered species. Fortunately, animals' perceived attractiveness can be enhanced by environmental education interventions, leading children to consider harming animals previously seen as unattractive less acceptable. In light of our results and

those of others (Colléony et al., 2017; Martín-López et al., 2017), environmental education programs that consider animals' affect-related factors, such as attractiveness, charisma, awe and interest, are certainly needed to promote a moralistic view of animals.

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Supplemental Material

Supplemental material for this article is available online.

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