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RESEARCH ARTICLE

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Impact of animal programming on children's attitudes toward local wildlife

Ashton D. Jerger[1] | Michele Acker[1] | Stormy Gibson[2] | Anna M. Young[1,3]

[1]Department of Biology and Earth Science, Otterbein University, Westerville, Ohio, USA

[2]Ohio Wildlife Center, Powell, OH, USA

[3]The Living Desert Zoo and Gardens, Palm Desert, California, USA

Correspondence
Ashton D. Jerger, Otterbein University, Westerville, OH, USA.
Email: Ashton.jerger@gmail.com

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Abstract

Attitudes toward wildlife can have direct implications on children's interest in conservation behaviors. Animal programs are an example of interactive, educational experiences that have the potential to change attitudes by providing individuals the opportunity to get close to animal ambassadors and participate in engaging conversations about them. We conducted an animal program assessment with summer camps at the Ohio Wildlife Center to quantify changes in children's affiliation with local wildlife and their willingness to live near local wildlife. Campers showed an overall increase in affiliation and willingness scores from before to after an animal program, although with a small effect size. Overall willingness scores were lower than affiliation scores, but there was a significantly larger increase in willingness following the program. We found a strong correlation between affiliation and willingness scores. Overall, the study found that these animal programs positively influenced children's attitudes toward local wildlife and increased their willingness to live near them, suggesting animal programming could be used to decrease human-wildlife conflict. Visually seeing animals in the programs improved attitude scores, even for those not seen in this study, which suggests that program animals can act as an ambassador for other species. This opens the potential for utilizing animal ambassadors as powerful tools in conservation education about threatened and endangered species.

KEYWORDS
affiliation, ambassador animals, willingness

1 | INTRODUCTION

Attitudes toward local wildlife can have direct influences on peoples' interest in conserving habitats and their behavioral intentions (Arnulphi et al., 2017; Fernández-Llamazares et al., 2020). Personal factors such as experience, social norms, values, and beliefs influence attitudes toward local wildlife (Fernández-Llamazares et al., 2020; Smith & Sutton, 2008; Van Deth & Scarbrough, 1998). Individual attitudes shape internal factors that influence environmental behavior changes, aiding in the formation of the "pro-environmental consciousness" (Kollmuss & Agyeman, 2002).

Without "pro-environmental consciousness," undesired interactions between humans and wildlife can occur due to resource and space competition (Mukhacheva et al., 2015; Rupprecht, 2017). This

problem, termed human-wildlife conflict, can lead to harm or the intentional removal of wildlife. These conflicts arise from direct issues between wildlife and people, but also from preconceived notions about where wildlife belongs (Arnulphi et al., 2017). Attitudes toward wildlife can be related to beliefs about species spreading diseases, attacking people or other animals, or other concerns (Baker et al., 2020). To ensure support of biodiversity conservation, factors that influence attitudes toward local wildlife need to be better understood (Hosaka et al., 2017). Two such factors are an individual's affiliation with local wildlife and their willingness to live near them. Affiliation for wildlife species relates to positive perceptions of the species (Baker et al., 2020). Experiences like spending time outdoors and other activities increasing one's exposure to wildlife are linked with more positive attitudes or affiliation (Baker et al., 2020; Ngo et al., 2019; Prokop & Tunnicliffe, 2015).

Childhood experiences in nature are another predictor of positive attitudes toward wildlife in adulthood and willingness to coexist with wildlife (Hosaka et al., 2017; Zhang et al., 2014). The role of these experiences is emphasized by Kellert and Wilson (1993) in their "biophilia hypothesis," which describes an innate interest in nature that is triggered in childhood development. The establishment of biophilia is critical, because of children's future roles in preserving natural resources (Kruse & Card, 2004). In addition to biophilia, other concepts such as connectedness to nature and environmental identity can also influence proenvironmental behaviors (Balundė et al., 2019). Not only do childhood experiences in nature impact the individual's interest and knowledge (Born, 2018; Cheng & Monroe, 2012; Sugiyama et al., 2021), but these attitude changes are a strong predictor of adults' affiliation with and willingness to coexist with species (Hosaka et al., 2017; Muslim et al., 2018; Ngo et al., 2019; Rosa et al., 2018; Sugiyama et al., 2021).

Educational programming is a form of childhood nature experience. Interactive experiences have an impact on attitude changes, while also improving knowledge scores (Barthel et al., 2018; Kalof et al., 2014; Kruse & Card, 2004; Pearson et al., 2012; Whitehouse et al., 2014). One interactive educational experience utilized by zoos and nature centers is animal programming, which features live animal ambassadors. These ambassadors are animals trained for visitor engagement (Clifford-Clarke et al., 2022; Watters & Powell, 2011). These animal ambassadors connect people to wildlife by seeing them up close, touching the animals, or witnessing trained behaviors in an educational setting (Clifford-Clarke et al., 2022; Miller et al., 2012; Watters & Powell, 2011). These animal programs also include interpretive presentations narrated by animal care or educational professionals, who share messages about the specific animals and conservation actions for the participants to engage in (Clifford-Clarke et al., 2022; Moss & Pavitt, 2019). Animal programs have been demonstrated to increase knowledge, change attitudes, and spread messaging about conservation and environmental responsibility (Baird et al., 2016; Mann-Lang et al., 2016; Mellish et al., 2016; Schönfelder & Bogner, 2017). Mellish et al. (2016) compared two conservation behavior learning approaches, one visiting an exhibit and one attending an animal encounter experience. Results found that visitors were more likely to learn new conservation messaging and more willing to change conservation behaviors after attending the up-close animal encounter (Mellish et al., 2016). This study assesses the role of up-close animal encounters in changing children's attitudes toward local wildlife, within the realms of affiliation and willingness. We test the hypothesis that ambassador animals in educational programming improve children's affiliation with and willingness to live near local wildlife. Specifically, we address the following questions and corresponding predictions:

1. Do animal programs increase the overall affiliation toward and willingness to live near local species? Do animal programs promote a general change in attitude toward species, or only for species that were viewed during the program? Does this effect persist over time? We predict that 1) if a child observes ambassador animals within an educational program, their ratings of affiliation and willingness for all species will increase after the programs; 2) children will have greater average "post" affiliation and willingness scores for species that were seen in programming as compared to not seen; and 3) scores of affiliation and willingness will persist over time from immediately after the program to approximately 3 months following.
2. How are affiliation and willingness to coexist with native species influenced by each other? We predict the increases in affiliation scores for local wildlife will be coupled with an increase in scores of willingness to live near local wildlife.
3. How do animal programs affect people's knowledge of effective ways to help local wildlife? We predict that scores in the knowledge of ways in which children can help local wildlife will increase following animal programs.

2 | METHODS

2.1 | Participants

We conducted the study at the Ohio Wildlife Center (OWC), which is a non-profit wildlife rehabilitation and education center in Powell, Ohio. The survey participants attended the OWC week-long camps from May to August of 2019, which featured animal programs at varying intervals. There were 239 campers across nine camps, with 141 completing both the "pre" and "post" surveys. Eleven campers completed a "delayed" response, which was the final survey sent to participants 3 months following the camp they attended. Survey participants ranged from 6 to 12 years of age, with the majority 6–8 years old. Two of the campers attended more than one camp, only the responses from their first camp were included in the results.

Consent from parents/guardians was obtained for all participants before they took the survey. A camp counselor asked for verbal assent before participating. The survey took on average about 3 minutes to complete and was Institutional Review Board approved.

2.2 | Animal programming

The campers participated in educational programs where ambassador animals were presented. These programs are when animals accompany a speaker who discusses details about the species, individual animals, and different ways people can help local wildlife. These programs were interactive and could include being up close to the animal, touching the animal, and asking or being asked questions. The animals presented depended on factors such as the training of staff, the timing of the programs, and the group age composition. The animals were either handled by staff or were stationed close to the campers. Ten ambassador species that had the potential to make an appearance were: *striped skunk* (*Mephitis mephitis*), *snapping turtle* (*Chelydra serpentine*), *woodchuck* (*Marmota monax*), *big brown bat* (*Eptesicus fuscus*), *woodland box turtle* (*Terrapene carolina carolina*), *Eastern foxsnake* (*Pantherophis gloydi*), *red-tailed hawk* (*Buteo jamaicensis*), *great horned owl* (*Bubo virginianus*), *Virginia opossum* (*Didelphis virginiana*), and *Eastern screech owl* (*Megascops asio*). All camps saw the *snapping turtle*, *woodland box turtle*, *red-tailed hawk*, *great horned owl*, and the *Virginia opossum*. Some of the camps saw the *striped skunk*, *big brown bat*, *Eastern foxsnake*, and *Eastern screech owl* and none of the camps saw the *woodchuck* (see Supporting Information: Table 1).

2.3 | Materials

The survey was created using Google Forms and was administered three times: a "pre" survey at the start of the camp, a "post" survey following the final animal program, and a "delayed" survey approximately 3 months after completion of the camp. A camp counselor was present during the "pre" and "post" surveys to explain questions and assist as necessary, as a pretest the previous year found that some children needed assistance. The "delayed" survey was emailed 3 months following the camps; participants who completed the "delayed" response were entered into a raffle for a $100 Amazon gift card.

Participants first answered demographic questions including name and age. The name was used to match surveys for analysis and was then discarded. Participants were presented with a series of questions for the 10 animal species. For *Affiliation*, participants were asked to rate how much they liked each species on a pictorial Likert scale (see Figure 1). For *Willingness*, they were asked to decide where they feel the most comfortable with the animals shown living in relation to them (see Figure 2). These scales were based on the scale used by Hosaka et al. (2017) and Muslim et al. (2018). For willingness, Hosaka et al. (2017) asked where participants felt the animals "belonged," but later critiqued their wording as being confusing. To address this, we changed the wording to "comfortable with," added a pictorial component, and had a counselor on hand to explain the question, such as "anywhere" representing the endpoint of the scale. We also added a fifth scale point to a willingness to set the affiliation and willingness questions on a similar 1–5 ranking (see Figure 2). The participants were asked to rank affiliation for all species first and then view the species again for willingness; the order the species was presented was the same for all participants and the original order was randomized. The final question of the survey was to assess knowledge of proenvironmental behaviors. It was a free-response question asking, "What can you do to help local wildlife?"

2.4 | Statistical analysis

To assess changes in affiliation and willingness, a matched, paired, one-tailed *t*-test was performed using the Likert scores from the "pre" and "post" surveys. A two-factor analysis of variance (ANOVA) was conducted on the difference between the "pre" and "post" scores for both affiliation and willingness Likert scores. A post hoc Tukey HSD was performed when a significant difference was detected within the ANOVA. A matched pairs t-test was conducted to test for significant changes from "pre" to "post." A repeated measure ANOVA was used to analyze changes across time, species, and the interaction between the two factors. An additional post hoc Tukey HSD was completed when a significant difference was detected with an ANOVA.

To assess the association of affiliation and willingness, the correlation between the mean of the Likert responses for both "pre" and "post" surveys was examined using Pearson correlation coefficients. Linear regression was used to determine how much variance in willingness scores could be explained by affiliation scores.

3 | RESULTS

3.1 | Assessing changes in affiliation and willingness scores

The overall mean scores for affiliation and willingness were above the midpoint for both before and after the program. To assess changes in affiliation and willingness from "pre" to "post," a

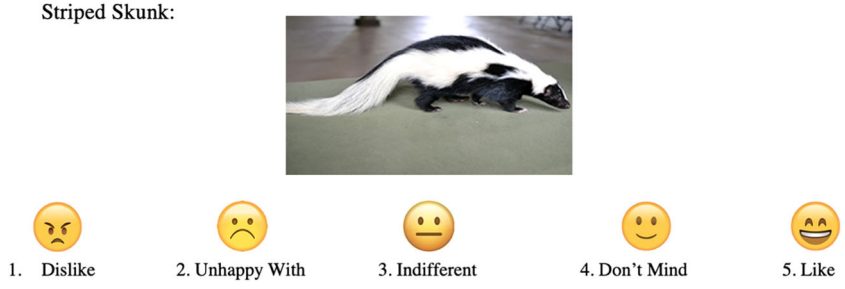

FIGURE 1 Example of the "affiliation" portion of the survey with the prompt of "For each of the animals, rank on the scale how much you like the animal." 1. Dislike. 2. Unhappy with. 3. Indifferent. 4. Don't mind; 5. Like.

FIGURE 2 Example of the "willingness" portion of the survey with the prompt of "Where would you feel the most comfortable with the following animals living?" 1. Nowhere near me. 2. Far away from me. 3. In the area. 4. In my backyard or near me. 5. Anywhere.

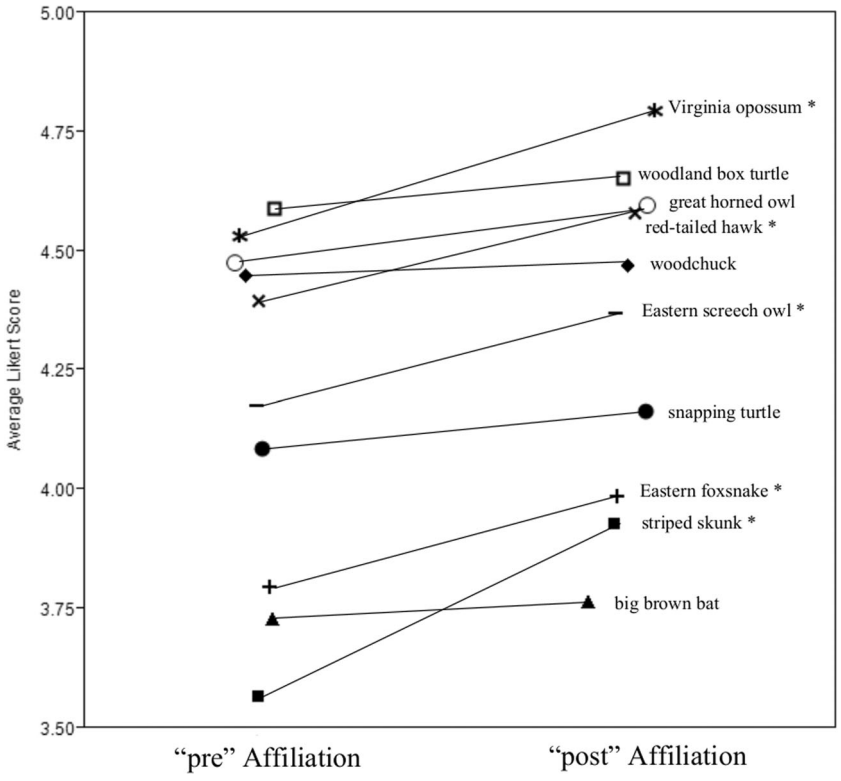

FIGURE 3 Averages of Likert scores for the affiliation portion of the survey for both "pre" and "post" (n = 141).

matched, paired, one-tailed t-test was performed using the average scores across all animals from the "pre" and "post" surveys. Overall, both mean affiliation and willingness scores increased with an initial score of "pre" = 4.18 and a "post" = 4.33 for affiliation and an effect size of d = 0.148. A larger increase in mean score occurred for willingness ("pre" = 3.54, "post" = 3.83, effect size d = 0.244). A 10 (species) × 2 (pre/post) repeated measures ANOVA revealed a significant interaction between species and "pre" and "post" scores for affiliation: $F_{(9,\ 140)} = 2.15$, $p = .02$. Post hoc pairwise comparisons revealed significantly more change in affiliation for *striped skunk* compared to *snapping turtle*, *woodchuck*, *big brown bat*, *box turtle*, and *great horned owl* (pairwise comparisons $p < .05$), and more change in affiliation for *Virginia opossum* as compared to *woodchuck*, *big brown bat*, and a *woodland box turtle*. There was no decline on average response between "pre" and "post" for affiliation toward any of the species, all average scores increased following the animal programs (Figures 3 and 4 and Table 1).

The 10 (species) × 2 (pre/post) repeated measures ANOVA for willingness showed greater overall change, but no significant species effect: $F_{(9,\ 140)} = 1.54$, $p = .13$. There was no decline in the average willingness response, indicating that the scores increased following the programs (Figures 3 and 4). Individual post hoc comparisons found that willingness to be near the *Eastern foxsnake*, *Virginia opossum*, and *Eastern screech owl* increased significantly more than it did for the *woodchuck*, and there was less change for the *Eastern foxsnake* and *Eastern screech owl* ($p < .05$) than the *woodland box turtle*.

We conducted a 10 (species) × 2 (rating type) repeated measures ANOVA on the mean difference scores to see if there was more change in willingness than affiliation. Between affiliation and willingness, willingness changed more than affiliation. There was an overall effect on animals ($F_{(9,\ 140)} = 2.48$, $p = .01$), as in the previous analysis, but there was also a significant effect on affiliation and willingness rating, with a greater change detected in willingness than in affiliation "post" program, $F_{(\ 1,\ 140)} = 8.38$, $p = .004$. There was no significant interaction between species and rating type ($p = .36$) in the

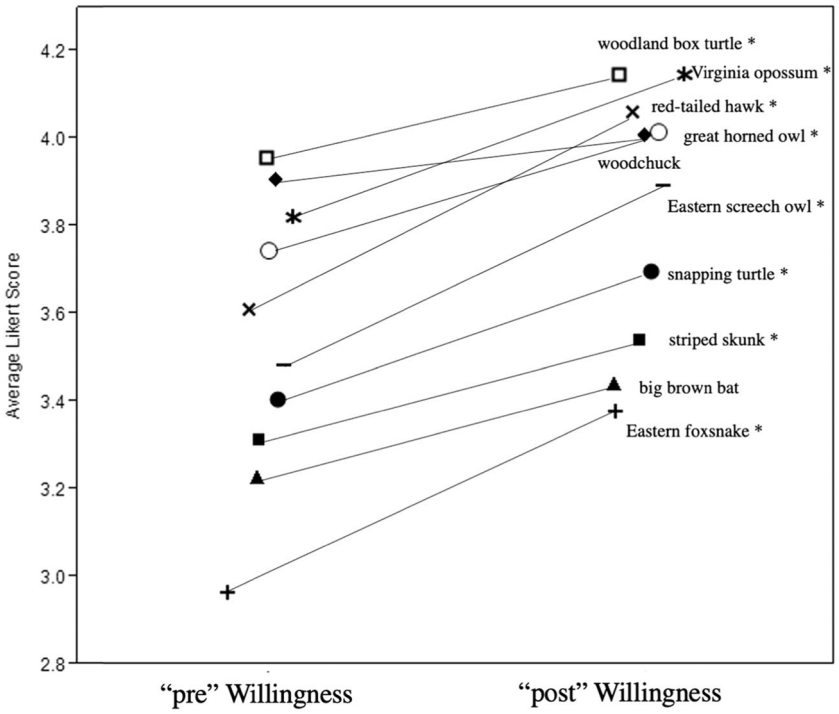

FIGURE 4 Averages of Likert responses for the willingness portion of the survey for both "pre" and "post" ($n = 141$).

TABLE 1 Mean differences between pre- and postscores for both affiliation and willingness ± standard deviation

Species	Affiliation mean difference	Willingness mean difference
Big brown bat	0.04 ± 0.87	0.21 ± 1.31
Eastern foxsnake	0.19 ± 1.08*	0.41 ± 1.20*
Eastern screech owl	0.19 ± 1.04*	0.41 ± 1.13*
Great horned owl	0.12 ± 0.89	0.27 ± 1.18*
Red-tailed hawk	0.18 ± 0.79*	0.45 ± 1.18*
Snapping turtle	0.08 ± 1.17	0.29 ± 1.19*
Striped skunk	0.36 ± 0.88*	0.23 ± 1.22*
Virginia opossum	0.26 ± 0.75*	0.33 ± 1.09*
Woodchuck	0.02 ± 0.94	0.10 ± 1.09
Woodland box turtle	0.06 ± 0.61	0.19 ± 0.90*

Note: $n = 141$.
*$p < .05$.

repeated measures ANOVA. Except for the *striped skunk*, "pre" to "post" differences were always larger for willingness than affiliation (Table 1).

To assess changes in affiliation and willingness in each species from "pre" to "post," a series of matched, paired one-tailed *t*-tests were conducted within species. There were significant increases in affiliation ratings for five species: *Eastern foxsnake* ($t_{(140)} = 2.102$, $p = .037$), *Eastern screech owl* ($t_{(140)} = 2.183$, $p = .031$), *red-tailed hawk* ($t_{(140)} = 2.774$, $p = .006$), *striped skunk* ($t_{(140)} = 4.878$, $p = .001$), and the *Virginia opossum* ($t_{(140)} = 4.140$, $p = .001$). For willingness ratings, a significant difference was found in matched paired one-tailed *t*-tests for all species except the *woodchuck* and *big brown bat*: *Eastern foxsnake* ($t_{(140)} = 4.065$, $p = .0001$), *Eastern screech owl* ($t_{(140)} = 4.330$, $p = 0001$), *great horned owl* ($t_{(140)} = 2.720$, $p = .007$), *red-tailed hawk* ($t_{(140)} = 4.567$, $p = <.0001$), *snapping turtle* ($t_{(140} = 2.896$, $p = .004$), *striped skunk* ($t_{(140)} = 2.207$, $p = .029$), *Virginia opossum* ($t_{(140)} = 3.568$, $p = .0001$), and *woodland box turtle* ($t_{(140)} = 2.522$, $p = .013$) (Supporting Information: Table 2).

3.2 | Evaluating scores of ambassador animals seen and not seen during animal programs

To evaluate the differences in affiliation and willingness scores as a function of species being seen or not seen, we conducted a series of one-way repeated measures, ANOVA, with the factors of "pre" and "post," and whether the species was seen. We did this for the four species (*striped skunk*, *big brown bat*, *Eastern foxsnake*,and *Eastern screech owl*) that were seen by some campers and not others. Although there was an effect for "pre" and "post" scores as described in Table 1, in each case, there was no effect being seen, and there were no significant interactions between "pre" and "post" and whether the specific animal was seen or not seen ($p > .05$).

3.3 | Analysis of responses over time

To assess changes from "pre," "post," and "delayed," the mean of the Likert responses was calculated for the "pre," "post," and "delayed"

surveys for the eleven children who completed all three surveys. A 3 (time) × 10 (species) repeated measures ANOVA was used to analyze changes across time. The interaction between the time the survey was taken, and species was not significant and was removed from further analysis. The differences in the timing of the survey were not significantly different for affiliation, which could be due to the smaller sample size ($F_{2,10} = 0.301$, $p = .748$). However, the differences between the species of animal ambassadors were significant ($F_{(9,10)} = 2.714$, $p = .007$) and an additional post hoc Tukey HSD determined that the *woodland box turtle's* score differed significantly from the *big brown bat*, however, no other species differed significantly from another. For willingness, there was no effect for timing of survey ($F_{2,10} = 2.078$, $p = .125$) nor species scores ($F_{(9,10)} = 1.163$, $p = .327$).

3.4 | Analysis of the relation between affiliation and willingness

Across all animals, there is a strong positive correlation between overall affiliation and overall willingness in both the "pre" ($r_{(139)} = 0.63$, $p < .001$) and the "post" ($r_{(139)} = 0.61$, $p < .001$). To see how this relationship differs by animal species, the data were transformed such that the mean affiliation scores for each animal were regressed on the mean willingness scores for each animal. The amount of variance explained was considerable for both "pre" ($R^2 = 0.796$) and "post" ($R^2 = 0.937$). Figure 5 demonstrates there was more variability by species in the "pre" than in the "post," and the larger R^2 in the "post" suggests willingness was more heavily influenced by affiliation after the animal programs.

3.5 | Assessing knowledge of conservation behaviors

The responses to the open-ended question "What can you do to help local wildlife?" were coded using the main behavioral change topics counselors were taught to discuss during the educational programs. These topics included: bringing injured wildlife to OWC, volunteering at OWC, cleaning up trash, building shelters like owl boxes, making gardens, not feeding wildlife, leaving healthy wildlife alone, keeping pets away from wildlife, and helping animals cross the street. Any response related to these topics was categorized as "correct, addressed," Some responses were not directly related to what was discussed by staff, but were determined "correct, not addressed." as they corresponded to conservation behaviors from a national survey (Belden & Rusonello Research and Communications, 1996; Dierking et al., 2004): spending time in nature, cutting down on the amount of trash, looking for/purchasing products that are environmentally friendly, learning more about wildlife, avoiding using chemicals in your yard/garden, visiting zoos and nature centers, helping create/improve habitats for wildlife, donating money to environmental organizations, talking to others about the importance of wildlife,

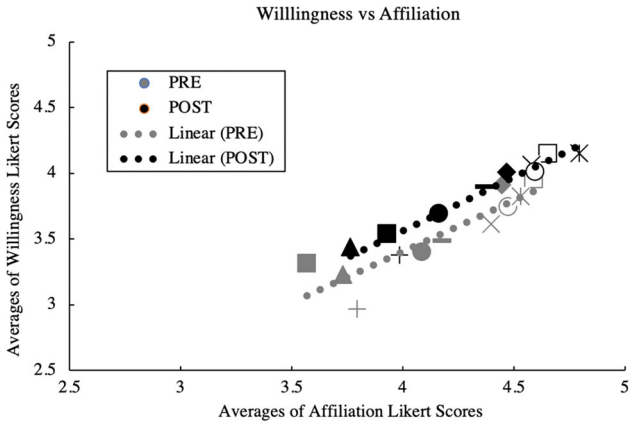

FIGURE 5 The average scores of Likert responses for both affiliation and willingness for all 10 ambassador animals: *big brown bat* (▲), *Eastern foxsnake* (+), *Eastern screech owl* (−), *great horned owl* (○), *red-tailed hawk* (X), *snapping turtle* (●), *striped skunk* (■), *Virginia opossum* (*), *woodchuck* (◆), and *woodland box turtle* (□). The R^2 value for the "pre" data was 0.796 and the R^2 value for the "post" data was 0.937.

using other types of transportation, doing volunteer work for a group that helps the environment. Responses that did not relate to these separate categories were deemed "incorrect, not addressed." If responses involved actions that campers were told specifically not to do by staff, like feeding wildlife, they were categorized as "incorrect, addressed." One response could have multiple correct answers, depending on how many actions the respondent recorded.

Percentages stayed consistent across categories between "pre" and "post" (Table 2). Two common answers were "don't litter/pick up litter" and topics directly related to the OWC such as bringing injured wildlife to the OWC. Cleaning up trash and not littering comprised 63.64% of the "correct, addressed" responses in the "pre" and 50.39% in the "post." OWC-specific responses were represented in 13.22% of the "correct, addressed" responses in the "pre" and 22.83% in the "post." Additionally, we assessed how many participants obtained new knowledge, as evidenced by mentioning different responses from "pre" to "post." Of the 141 participants, 60 (42.55%) mentioned new ways to help local wildlife.

4 | DISCUSSION

There was a small, but measurable, effect of animal programs on children's reported affiliation toward wildlife, and their willingness to have them live nearby. As we hypothesized, there was an increase in all average affiliation and willingness scores in this study. This supports the role of animal programming in providing an interactive opportunity to change children's perspectives of local wildlife species. Our results align with prior research that interactive educational experiences can impact children's attitudes toward biodiversity (Kruse & Card, 2004; Mnisi et al., 2021; Toomey & Domroese, 2013; Zárybnická et al., 2017).

TABLE 2 Knowledge statements are categorized as a function of correctness and whether they were addressed in the camp

	Pre (n = 193)	Post (n = 202)
Correct		
Addressed	62.87% (121)	62.87% (127)
Not addressed	27.98% (54)	26.73% (54)
Incorrect		
Addressed	6.22% (12)	5.94% (12)
Not addressed	3.12% (6)	4.46% (9)

Note: Values are the percentage of the total, with the number of responses in parentheses.

There were high "pre" scores of affiliation and willingness for the 10 animal species; the *Eastern foxsnake* was the only species that had an initial score beneath an average of three for the "pre" willingness portion. This can be ascribed to a general aversion to snakes (Ballouard et al., 2012; Öhman & Mineka, 2003; Zhang et al., 2014). The *big brown bat* and the *striped skunk* also had lower scores which could be due to the fear of disease associated with certain mammal species, as suggested by Hosaka et al. (2017) and Soulsbury and White (2015). Nonetheless, some of the largest changes in willingness were for the *striped skunk* and the *foxsnake*, showing that education can rectify some fears, potentially through knowledge gain or increased empathy (Young et al., 2018). We found children are more willing and interested to have animals like owls, *Virginia opossums*, and *woodland box turtles* live near them. Although there were improvements in affiliation, there was a significantly greater change in willingness, which is important as the willingness to have a species nearby is a behavioral intention. This indicates that animal programs could be a method employed in resolving human-wildlife conflict related to willingness to coexist with local wildlife.

4.1 | Roles of types of animals seen during animal programs

Seeing particular ambassador animals during programs was not determined to be a significant factor in the changes in affiliation and willingness. The results suggest that the animal programs as a whole impacted the mean difference scores of affiliation and willingness. Similarly, Kalof (2014) found seeing a slideshow of animal portraits can improve feelings of kinship and enhanced perceptions of all animals. Visually seeing animals in the programs improved willingness scores, even for those not seen in this study, except for the *woodchuck* and *bat*. This suggests that program animals can act as an ambassador for other species rather than just their own. This implies that messaging can be implemented to improve attitudes toward multiple species, without directly seeing the main species in the discussion. This opens the potential for utilizing animal ambassadors as tools in conservation education; further research should explore the possibilities and limitations of using animal ambassadors to change attitudes about other species.

4.2 | Affiliation and willingness scores over time

The results demonstrate that animal programs can impact children's scores of affiliation and willingness for local wildlife, however, it is yet to be determined if these attitudes persist over time. The limited sample size of the "delayed" response in this study does not allow us to draw firm conclusions, but the results from this portion of the study suggest that increases in affiliation and willingness scores may decay. The decline on average scores could be due to the lack of reinforcement of the message over the months following the camps (Dierking et al., 2004). While the improvement in attitudes did not seem to last several months in these 11 children, other research suggests that the time spent engaged in nature activities as children can impact attitudes into adulthood (Hosaka et al., 2017; Ngo et al., 2019; Rosa et al., 2018; Soga et al., 2016). Future work could investigate whether it is childhood nature attitudes that develop into adult attitudes or whether it is childhood experiences that independently influence adult attitudes.

4.3 | Relation of affiliation and willingness scores

The relationship between affiliation and willingness suggests that the higher the scores in affiliation for a particular species, the more willing respondents were to live near the animal. Other research has also found the likeability of species to be significantly correlated with the willingness to coexist (Hosaka et al., 2017; Muslim et al., 2018). The relationship was stronger after animal programs, further emphasizing that interactive nature experiences can help link affiliation to willingness (Cheng & Monroe, 2012; Collado et al., 2013; Soga et al., 2016; Zhang et al., 2014). Interactive educational programming, such as immersive interpretation programs (Burnett et al., 2015), viewing animal portraits (Kalof et al., 2014), or games (Whitehouse et al., 2014), can be effective at raising awareness of these perceived wildlife conflict problems, improving perceptions and attitudes, and promoting knowledge gains (Barthel et al., 2018; Crudge et al., 2016; White et al., 2018).

Understanding the correlation between affiliation and willingness is important because individuals may have a high affiliation for certain species but not be willing to live near them. Eriksson et al. (2015) found this contradiction where most respondents in their study had a high affiliation for bears and wolves, but support for the species declined after encountering these animals around their homes. Thinley et al. (2019) similarly noted positive attitudes toward golden langurs decreased significantly among those who experienced crop damage by the langurs. Environmental education raised awareness about methods to coexist with langurs and mitigate the human-wildlife conflict experienced, which had a significant impact on individuals' attitudes toward the species (Thinley et al., 2019). Further research should explore how increasing affiliation could be a method used to improve willingness to live near wildlife. In addition, an animal's charisma can have an

influence on perceptions and interest in conserving them (Albert et al., 2018). As referenced by Albert et al. (2018), people are more influenced by charismatic species, and these species are often targeted as flagship species for proenvironmental behavior awareness. Assessing how local species' charisma rank for public perceptions would be beneficial to assess, as well as how interactive programs can influence charisma.

4.4 | Animal programming as an educational platform

Most responses to the question about helping wildlife were in the "correct, addressed" category. One of the most common responses was "cleaning up trash/not littering," consistent with Smith et al. (2010), who suggest that behaviors more commonly accepted are easy to do and have a clear connection to how it helps. Although there were few incorrect responses in the "pre," there did not seem to be an improvement since there was the same percentage of incorrect responses in the "post." It is possible that this was due to inconsistent messaging, or actions recommended may not have been within the child's locus of control. However, 41.67% of respondents mentioned new ways to help local wildlife species after the programs, indicating knowledge gains. In particular, the responses specific to the OWC increased in percentage between the "pre" and "post" surveys. Much of the messaging during these programs related directly to the animal ambassadors' histories; all are rescued wildlife that was brought to the OWC's wildlife hospital. Animals treated, but deemed unable to rerelease, often become ambassador animals and help increase awareness about bringing sick or injured wildlife to OWC's hospital. Children were more likely to say animals should be brought to OWC after the program, suggesting the impact of the specific ambassador animals' stories. Storytelling is valuable within biodiversity conservation as it can improve perceptions of species and gain conservation support (De Groot & Zwaal, 2007; Hughes, 2013; Smith et al., 2010). Relaying core conservation messaging via stories could lead to greater gains in conservation behavior knowledge.

4.5 | Implications and future studies

In this study, educational camps featuring animal programs had a demonstrable impact on children's attitudes toward local wildlife, although with a small effect size. This small effect size could be a function of the initial high scores of affiliation and willingness for the 10 species. The participants of this survey chose to attend a nature camp, which implies a pre-existing interest in wildlife, and thus higher than average affiliation and willingness. It would be worthwhile to survey children who were not self-selected and might have lower initial scores (e.g., a public-school class), to assess the impact of animal programs on children whose initial views of animals were more negative. Soga et al. (2016) found that children with less direct experience in nature are less likely to develop positive attitudes toward biodiversity than those with frequent nature experience. How much improvement of attitudes can be gained by a single program, and what kind of nature experience it can encompass requires further exploration. In addition, a component including qualitative responses in the survey would further assess individuals' perceptions of local wildlife species. As our design methodology can't extricate the effect of animal ambassadors specifically, a beneficial experiment would include a control group where similar programming is supplied without live animal ambassadors to test for the impact of the presence or absence of an animal present separate from that of the program content. One study on the effectiveness of nature camps found improvement in environmental attitudes after participating in nature camps compared to an urban camp with the same messaging (Collado et al., 2013). This suggests that the effect of the location of the experience is more important than the content delivered, but for those who cannot travel to a nature camp, animal programming could circumvent that barrier. Assessing animal programs as a form of direct nature experience with an animal ambassador present or not present can inform how to best direct resources in conservation education. Implementing controlled experiments showing different animals would further extrapolate what animals could act as ambassadors for multiple different species. Simultaneously, assessing particular animals that may be interpreted as "fearful" or not as charismatic, and determining the impact interactive experiences may have on alleviating these fears or preconceived notions would be impactful.

The strong correlation between affiliation and willingness suggests that conservation education programming should have a dual focus, stressing the need for coexistence with native species during animal programming and seeking to improve empathy for local wildlife (Cheng & Monroe, 2012; Collado et al., 2013; Soga et al., 2016; Zhang et al., 2014). The children in our study learned new behaviors, so we believe programs should stress specific methods of helping local wildlife with real-world examples that are less commonly known (Smith et al., 2010). Programs can be adapted to the audiences like the children in this study by emphasizing behaviors that children can practically do, or by actively having guests participate in the behavior during the program, for example, helping plant a pollinator garden (Mnisi et al., 2021; Smith et al., 2010).

Participants had particularly positive pre-existing attitudes toward wildlife, which may be a contributor to the small effect sizes documented in this study. Future studies on animal ambassadors should expand to audiences outside of attendees of a wildlife camp, such as elementary schools, and incorporate children from rural, suburban, and city environments. Participants from different environments may have more negative preconceived notions about the local wildlife based on experiences, and this may provide even more possibilities for improving attitudes and reducing human-wildlife conflict (Soga et al., 2016). Ideally, research with a longitudinal component would portray how this attitude changes from animal programs could persist over time and impact conservation behaviors.

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CONFLICT OF INTEREST

The authors of the study certify that they have no involvement with any organization for means of financial interest that would lead to influencing the authors' objectivity. The nonfinancial partnership with the Ohio Wildlife Center (OWC) and Otterbein University highlighted in this manuscript was strictly for the development and execution of the research project. No financial or other benefit was granted to either party that would influence the findings or submission of this manuscript. Stormy Gibson was employed at the OWC and did not participate in any data collection or analysis that would influence the results of this manuscript, the research was not funded by OWC.

DATA AVAILABILITY STATEMENT

The anonymized data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Ashton D. Jerger http://orcid.org/0000-0001-5689-8495
Anna M. Young http://orcid.org/0000-0003-3321-1878

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SUPPORTING INFORMATION

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