



CAN A GUIDED ZOO TOUR IMPROVE CONNECTION TO NATURE?

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YOUNG REVIEWERS:



ANSHUL
AGE: 11



CATHERINE
AGE: 15



HARRISON
AGE: 11

Humans' connections to nature have been declining over time. This is problematic because people with a weaker connections to nature pay less attention to the environment and tend to show less environmentally friendly behavior. Environmental education programs are one way to address our declining connection to nature. In our study, we examined whether a 1-h guided zoo tour could improve high school students' connections to nature. We also examined the impact of five add-ons to the tour (feeding giraffes or meerkats, a behind-the-scenes look, a keeper talk, and a visit to the petting zoo). We found that even a short environmental education program can increase students' connections to nature. Special experiences, such as feeding a giraffe, showed a particularly positive effect, while negative experiences, such as disgust, led to a slightly negative effect. Our study provides evidence for the effectiveness of short environmental education programs in reconnecting people to nature.

WHY IS THE HUMAN-NATURE CONNECTION IMPORTANT?

Today's children and adolescents, as you might have noticed, spend a lot of time watching TV, using computers, or on their smartphones. Perhaps your parents sometimes tell you that, as children, they spent much more time out in nature than you do today. Nowadays, adults *and* children are spending less and less time outdoors in nature. As a result, the connection that people feel with nature is decreasing more and more.

Why is it a problem when our connection to nature decreases? Evidence suggests that a high degree of connection to nature has positive effects. For example, a connection to nature motivates people to protect the environment, and people who are connected to nature usually show more environmentally friendly behavior [1]. It has also been observed that people who are connected to nature are happier, healthier, and generally feel better. Some scientists even assume that our declining connection with nature is partly responsible for many of our present environmental problems. These examples show how important it is to be connected to nature. Therefore, it is important to try to increase these connections—especially in children and young adults.

But how can we increase young people's connections to nature? As you might imagine, time spent outside in nature is a very important component. People who regularly spend time in nature generally show a stronger bond with nature [2]. Another way to improve children's connections to nature is through programs that teach them about environmental problems, **sustainable behavior**, and how to treat nature well.

SUSTAINABLE BEHAVIOR

Behavior that helps to protect and preserve nature and the environment.

A QUESTIONNAIRE TO STUDY CONNECTION WITH NATURE

In this study, we investigated whether a 1-h guided zoo tour could improve children's connections to nature. Previously, scientists had only studied the effects of longer education programs; no one had studied whether a short environmental education program like a zoo tour could have a positive effect on the human-nature connection. We also wanted to learn whether small extra elements added to the zoo tour (for example, a conversation with an animal keeper) had an additional positive effect on children's connections to nature.

To study this, we invited over 600 high school students ages 15–19 to take part in guided tours at the Opel-Zoo in Kronberg (Germany). Many students in this age range feel little connection with nature and also have little interest in animals or zoos. But how do we actually measure a person's connection to nature? In the field of

ENVIRONMENTAL PSYCHOLOGY

A field of research that is especially focused on the relationship of the individual with the environment.

INCLUSION OF NATURE IN SELF SCALE (INS)

A questionnaire to measure a person's connection to nature.

Figure 1

The inclusion of nature in self scale is used to measure a person's connection to nature. Participants are asked how connected they feel to nature and directed to choose the pair of circles that best describes their relationship with nature.

environmental psychology, there are special questionnaires for this purpose. If a person completes such a questionnaire honestly, scientists can determine how strongly that person is connected to nature.

We used a questionnaire that included a measurement called the **Inclusion of Nature in Self Scale (INS)** [3], which is a simple and quick way to determine how connected someone is to nature. The questionnaire consists of seven pairs of circles (Figure 1). One circle represents the person, and the other represents nature. Students were asked to choose the pair of circles that they thought best described their relationship with nature. You can try it yourself! Which of the seven pairs of circles best describes *your* relationship with nature? The INS has been used in many scientific studies and it has been found to be a useful tool to measure connection to nature [4].

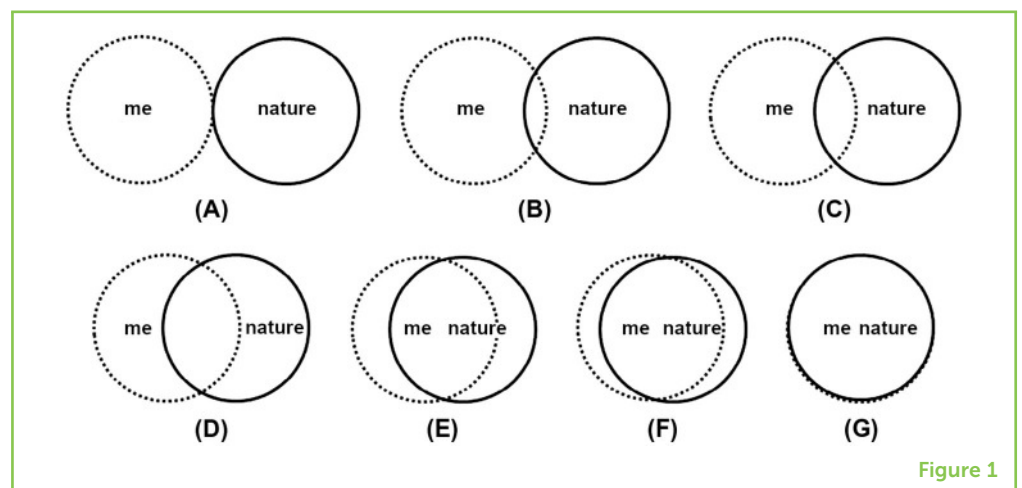


Figure 1

CAN A ZOO TOUR INCREASE CONNECTION TO NATURE?

So, what exactly did we do with the students at the zoo? Before we started the zoo tour, we used the INS to measure the students' connections to nature. Then the students attended a 1-h zoo tour, during which they were shown most of the zoo. The tour was guided by a zoo educator who explained a lot about the different African animals, like giraffes and elephants, their living spaces, and how endangered they are.

To test whether small add-ons to the tour could further influence connection to nature, some groups were given one of five additions at the end of the tour. These add-ons included feeding giraffes, feeding meerkats, a behind-the-scenes look at the elephant house, a talk with an animal keeper, or a visit to the petting zoo. We did not tell the groups in advance if they would have a regular tour or a tour with an addition. After the tours (and additions), the students' connections to nature

were measured again with the INS. An overview of our study can be seen in Figure 2.

Figure 2

After an initial measurement of students' connections to nature using the INS, a regular zoo tour was conducted. Afterwards, some groups participated in one of five different add-ons. Finally, the connection to nature was measured again, using the INS.

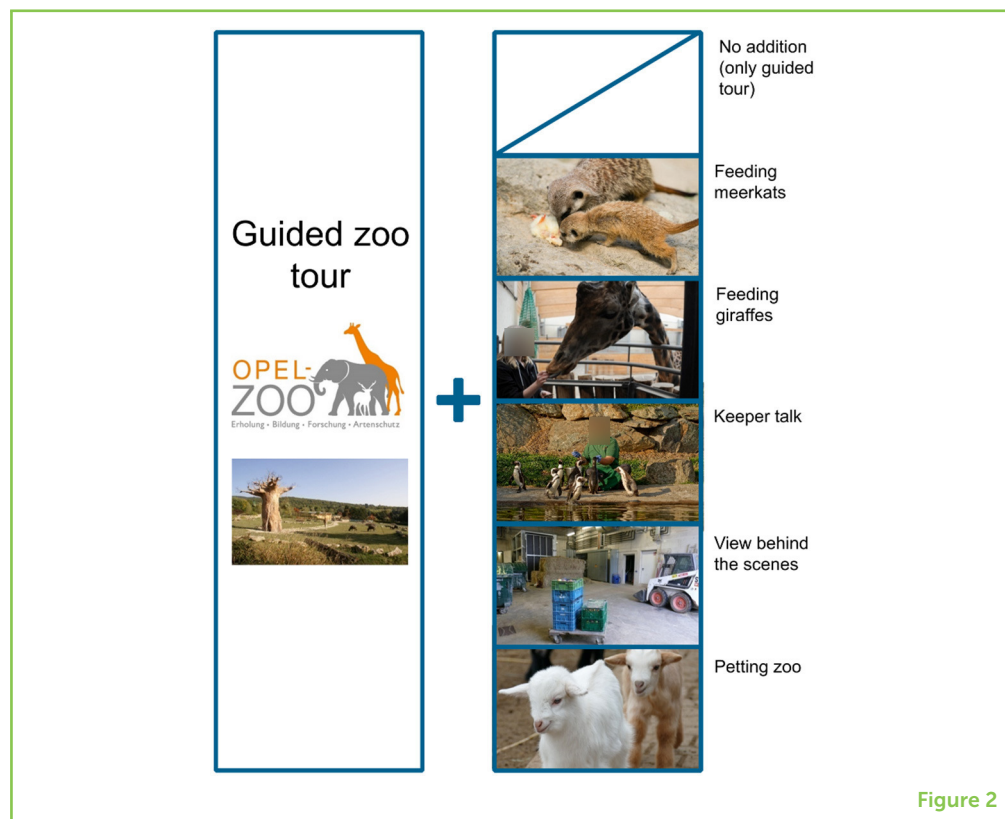


Figure 2

RESULTS: CONNECTION INCREASED!

What did we find? Evaluation of our data showed that connection with nature increased during almost all of the guided zoo tours. However, the tours with the feeding of meerkats caused the connection with nature to decrease slightly. Results are summarized in Figure 3.

Figure 3

Our study showed that most of the guided zoo tours resulted in an increase in nature connectedness. Green bars represent an increased connection to nature. Only the guided tour that included feeding meerkats (red bar) resulted in a decreased connection to nature.

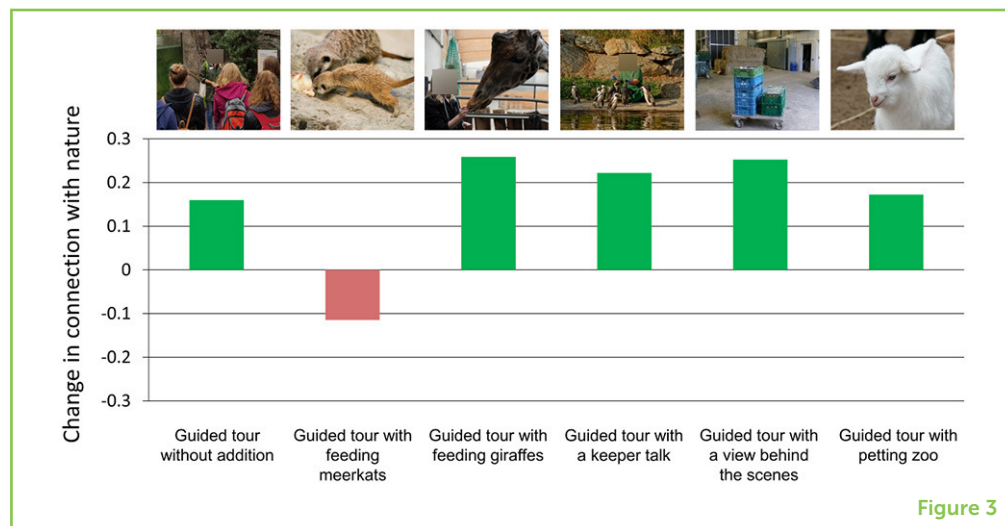


Figure 3

These results demonstrated that even a short program, such as a 1-h zoo tour, could have a positive effect on high school students' connections to nature. The group that fed giraffes after the guided tour experienced the largest effect. The opportunity to feed a giraffe and to have direct contact with this special animal seemed to especially promote the students' connections to nature. The behind-the-scenes view of the elephant house and the talk with the animal keeper also had a strong positive effect. It seems that these special experiences helped to promote connection to nature. The tour without an addition and the tour with a visit to the petting zoo showed only a small increase in connection to nature. These experiences might not have felt as special to students—the petting zoo, for example, is open to all visitors, and the guided tour only involved following the normal zoo routes.

Why was there a slight decline in connection to nature when meerkats were fed? Meerkats are very popular zoo animals and many visitors find them extremely cute—so we were surprised about this result at first. There are two possible explanations for this finding. First, students could only look at the meerkats through a glass window and the animals could not be petted, because they are predators that could hurt visitors. Students may have been disappointed about this, which may have negatively impacted their connection to nature. Second, the food the students fed the meerkats could also have had a negative effect. Meerkats are **carnivores**, so students fed them live mealworms. Many students were disgusted by this and did not want to touch the mealworms. Their feelings of disgust might have negatively affected their connections to nature.

CARNIVORE

An animal that eats meat from other animals.

CONCLUSION

In summary, our data indicate that zoo tours can increase young people's connections to nature. Special experiences, such as feeding giraffes, reinforced the positive effect, while negative experiences, such as disgust, seemed to decrease students' connections to nature. This study showed that even a simple and short environmental education program can have a positive effect and contribute to an increased connection to nature.

An increased connection to nature is likely to directly influence the conservation of species. People who are more connected to nature value nature more and show more environmentally friendly behavior, which leads those people to be more willing to protect species and their habitats. An example from Western India showed the positive influence of environmental education on species protection. Several species of critically endangered fruit bats were protected through environmental education [5]. **Empathy** for animals is also positively linked to connection with nature. Work like ours is important because many of Earth's animals are endangered due to human activities, and our decreasing connection with nature could be contributing to the

EMPATHY

The ability to share or understand feelings.

decline of these species. Increasing people's feelings of connection with nature could help to protect the lives of these endangered animals, keeping them around for future generations.

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YOUNG REVIEWERS

ANSHUL, AGE: 11

Hello! My name is Anshul and I am a sixth grader at Germantown Academy, which is close to Philadelphia. I am very interested in Biology and Entomology. I am an active member of the Johns Hopkins CTY program, and my favorite hobby is to read.



CATHERINE, AGE: 15

I love music and singing, I play the violin and guitar and I also enjoy writing! I am part of a highland dance troop and volunteer with children at local kids clubs and guides. I enjoy attending youth events at my church and doing fitness. I hope that by reviewing these articles I could learn about new and interesting stuff!



HARRISON, AGE: 11

I love playing sports such as hockey and going running and chasing my dog! I also love discovering new things, but not new foods! Because I currently go to primary school I am excited to start my new secondary school and try lots of new subjects. My favorite subject at the moment is math.



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