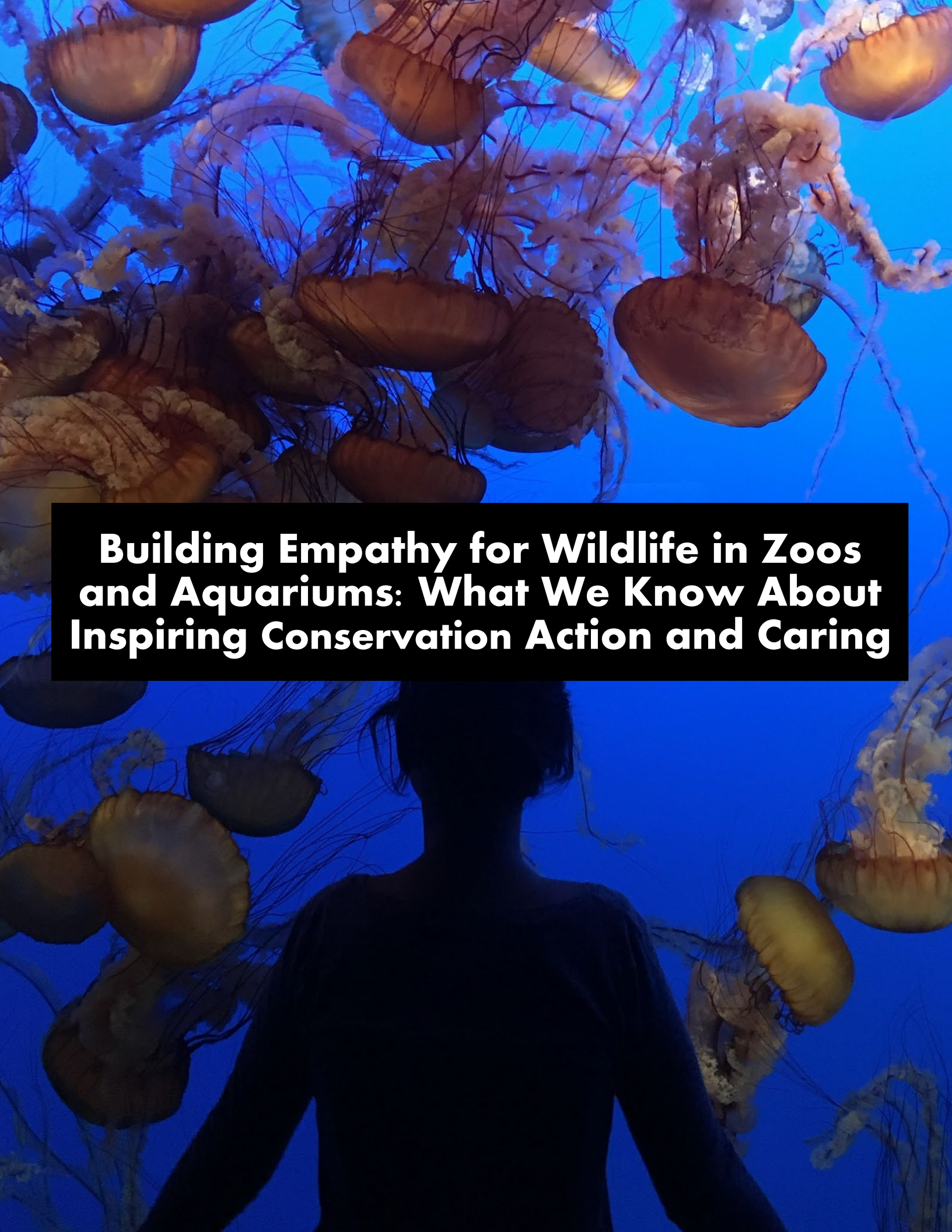

Building Empathy for Wildlife in Zoos and Aquariums: What We Know About Inspiring Conservation Action and Caring

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SOCIAL ECOLOGY LAB

WOODLAND PARK ZOO

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Quick Guide: Building Empathy for Wildlife Conservation and Caring

Zoos and aquariums have unique opportunities to create meaningful connections between visitors and wildlife. Research shows that when people feel empathy for wildlife, they are more likely to take action to protect and care for it. But how do we effectively build this empathy, and how do we turn it into real conservation action and caring behaviors?

What We Know About Empathy and Conservation

- Research across more than 30 studies shows a link between empathy and conservation behavior.
- People with higher empathy for wildlife may be more likely to donate to conservation efforts, make wildlife-friendly consumer choices, and support conservation policies.
- Both emotional connection (feeling) and understanding (thinking) components of empathy contribute to conservation action.
- The empathy-action connection holds true across different cultures and contexts.

Key Principles to Develop Empathy in Zoo and Aquarium Visitors

- Design thoughtful animal encounters.
- Use strategic interpretation.
- Support multiple learning approaches.
- Facilitate emotional processing.
- Connect to conservation action.

Making it Work in Practice

- Design experiences that balance emotional connection with clear conservation messages.
- Train staff to model empathetic behavior and facilitate meaningful connections.
- Create opportunities for visitors to understand animals' perspectives and needs.
- Provide specific, achievable conservation actions visitors can take.
- Consider impact and development of empathy-related concepts like connection to nature, emotional connections, awe, and compassion.

Evidence shows that building empathy can be a powerful tool for wildlife conservation, but it requires thoughtful implementation. Success comes from combining emotional connections with clear pathways to action while respecting both animals and visitors. The strategies and research evidence provided in this guide can help your institution develop effective approaches to building empathy that leads to real conservation outcomes.

Part 1: Introduction

Many zoos and aquariums are increasingly interested in developing empathy in their visitors to increase conservation action and caring behaviors. However, questions often arise about the evidence supporting this approach: How do we know empathy supports conservation action or caring behaviors? What research exists, particularly in zoo and aquarium settings? How can we make a compelling case for empathy-based programming?

This guide synthesizes current research and evaluation relevant to empathy development in zoos and aquariums, with a focus on how empathy supports conservation action and caring behaviors. While it does not provide step-by-step implementation strategies, this guide distills key findings from research and evaluation that practitioners can use to:

- Understand the research evidence linking empathy to conservation and caring outcomes.
- Access up-to-date findings from both academic research and program evaluations.
- Make evidence-based decisions about empathy development programming.
- Support discussions about incorporating empathy-based approaches into their work.

The following sections explore what empathy is, why it matters for conservation, and how zoos and aquariums might effectively foster it in visitors. Throughout the guide, we highlight practical implications while maintaining a strong grounding in the research evidence base.

What is Empathy?

Simply put, empathy describes one person's reactions to someone else's experience.[1] Researchers across many fields—from psychology and philosophy to neuroscience and art—have studied empathy, creating countless empathy definitions.[2] While there hasn't been clear agreement on exactly what it means, most agree empathy has several distinct parts that work together.[3,4]

When researchers recently looked at all the different ways experts define empathy, they found four key elements that show up again and again. Empathy is understanding, feeling, and sharing what someone else is experiencing, while still maintaining a clear sense that the person's experience belongs to them and not us.[5] It's like stepping into another person's shoes to understand their perspective and emotions while remembering that it remains their experience. This balance between connecting deeply with others while maintaining healthy boundaries is what makes empathy so powerful.

Researchers often focus on two parts of empathy: thinking and feeling.[6] The thinking part (called cognitive empathy) involves understanding what someone else is going through from their perspective. The feeling part (called affective empathy) is when we experience emotions similar to what we perceive the other is feeling.[7] For example, if a friend loses a loved one, cognitive empathy helps us understand their grief while affective empathy allows us to feel some of that

sadness ourselves. Both parts work together—we need to both understand and feel to truly empathize with others.

Neuroscientists have identified fascinating insights into the biological basis of empathy. When we observe others' emotions, our brains activate regions involved in emotional processing and understanding.[8,9] This neural activation helps us understand and connect with others' emotional experiences. However, empathy isn't just hardwired into our brains—it's also shaped by our experiences, cultural background, and relationships. While some people may be naturally more empathetic than others, empathy is a skill that can be developed and strengthened through learning, practice, and meaningful social connections.[10,11]

Why Care About Empathy?

Experiencing empathy can offer powerful benefits for people, including improved personal health and well-being.[12,13] People with greater empathic capabilities are thought to excel in certain jobs, such as teachers[14,15] and health care providers.[16,17] Empathy also acts as a cornerstone of healthy relationships; increased empathy improves relationships with others and helps build stronger social networks and communities.[18,19]

However, the most profound impact of empathy may be its role in driving helping behaviors and promoting moral development. Recent research describes a strong evidence base for a link between empathy and prosocial behaviors, a term used to describe a voluntary action intended to help or benefit others.[20] Prosocial behaviors include actions like comforting a distressed friend, sharing resources with those in need, volunteering at community organizations, standing up against injustice, and mentoring others.[21]

Psychologists and other empathy researchers often talk about the empathy-altruism hypothesis,[22] which details how empathy for others reliably motivates helping behavior - even when there is no apparent benefit to the helper. When people feel genuine empathy for others in need, they are motivated to help primarily out of concern for the other's welfare, rather than for personal gain or to avoid negative consequences. Other researchers have explored how empathy underlies moral development, informing a sense of right and wrong. As children develop more sophisticated empathy, they can better understand others' perspectives and emotions, which helps them internalize moral principles and engage in justice-seeking behaviors.[23]

This connection between empathy, helping behavior, and moral development makes empathy vital for addressing societal challenges. Whether confronting issues like social inequality or environmental protection, empathy provides both the motivation to help and the moral framework for determining the right action.

Why Should Zoo and Aquarium Professionals Care About Empathy?

Zoo and aquarium professionals have many reasons to care about empathy. While researchers often focus on human-to-human empathy, work is being done to understand empathy as it relates to animals. For example, people do not have a monopoly on empathy, with research showing other animals (particularly species known to be social, such as bonobos and chimpanzees) are capable of empathizing with other members of their groups.[24,25,26] Knowing more about how animals feel and think can certainly be useful for people working with wildlife.

The focus of this guide, however, is on how zoo and aquarium professionals can help develop empathy in visitors to their facilities. While increasing visitor empathy could improve the visitors' own lives through better health and relationships, zoos and aquariums are often interested in developing empathy to encourage wildlife caring and conservation behaviors.[27,28] To do this, we need to better understand empathy for wildlife.

In addition to empathy for people, our capacity for emotional connection extends to other living beings and even to the natural world. We can feel distress at the suffering of animals, concern for endangered species, and emotional connections to places and ecosystems. Researchers have studied people's empathy for animals,[29] wildlife,[30] farm animals,[31] nature,[32] oceans,[33] and even empathy for plants.[34] And as this area of research grows, we are seeing work examining how people's empathy may or may not differ for specific groups of animals. For more details about this line of research and relevant references, please see Appendix A.

This guide presents an introduction to the research and evaluation that can help connect empathy and wildlife conservation. Applying what we know should help support wildlife conservation and caring behaviors, but first let's explore what we mean by wildlife conservation and caring behaviors.

What Are Wildlife Conservation and Caring Behaviors?

Wildlife conservation behaviors are actions people take to protect wild animals and their habitats.[35] These behaviors range from personal actions like making eco-friendly purchases and learning about wildlife, to participating in broader efforts like joining environmental groups, signing petitions, and supporting wildlife-friendly policies.[36] Think of it as a ladder that visitors can climb, progressing from simple actions to behaviors that require a larger investment of time and effort.

High-Level Wildlife Conservation Behaviors

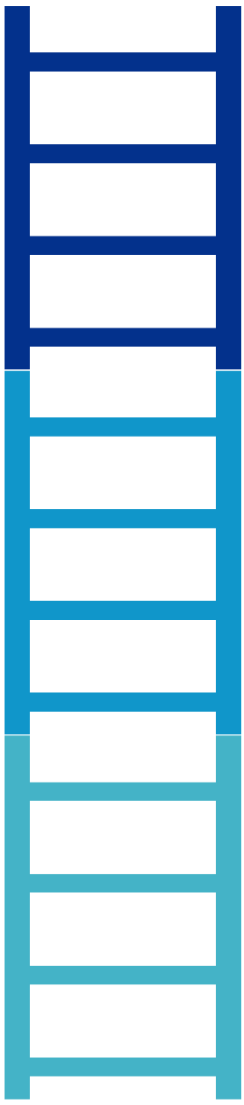
- Leading wildlife conservation initiatives
- Regular volunteering for wildlife conservation causes
- Becoming a wildlife conservation advocate
- Making major lifestyle changes

Mid-Level Wildlife Conservation Behaviors

- Donating to wildlife conservation projects
- Signing petitions or writing to legislators
- Teaching others about wildlife conservation
- Consistently making sustainable choices

Entry-Level Wildlife Conservation Behaviors

- Learning about wildlife conservation issues
- Sharing about wildlife conservation messages on social media
- Making small lifestyle changes



Caring behaviors focus more on direct, compassionate treatment of animals and nature, such as providing appropriate care for pets or domestic animals, helping injured wildlife, showing kindness to animals, creating wildlife-friendly spaces (like bird feeders or pollinator gardens), and making cruelty-free consumer choices.[37,38] In zoos and aquariums, caring behaviors include treating animals with kindness and respect through appropriate visitor behaviors such as using quiet voices, moving slowly, not banging on glass, and gently touching animals when touching is allowed.[39,40]

Despite previous connections between conservation and caring[41] and emerging movements like compassionate conservation that explicitly link empathy to wildlife protection,[42,43] there is surprisingly limited empirical research examining how empathy specifically drives caring behaviors in wildlife contexts.

In a lot of the research discussed in this guide, you'll hear about **pro-environmental behaviors**. This is a broad category, encompassing actions that aim to minimize negative impact on or benefit the natural environment.[44,45] These can include reducing energy consumption, recycling and composting, using sustainable transportation, making sustainable purchasing decisions, supporting environmental policies, reducing water usage, and choosing renewable energy.

Wildlife conservation behaviors, caring behaviors, and pro-environmental behaviors typically share common psychological foundations like empathy, connection to nature, and environmental awareness. They're also influenced by similar factors like education, values, and cultural background. However, the relationship between these behaviors is complex. They can reinforce each other, as people who engage in one type often engage in others. But they can sometimes conflict—for example, people may feed wildlife out of an assumption of care and compassion, but this behavior can be harmful to animals or undermine conservation efforts.

Part 2: Research Linking Empathy and Conservation Action

Does Empathy Really Lead to Conservation Action?

The short answer is yes—there's evidence that people who feel more empathy for wildlife are more likely to take conservation action. But as with many things in science, the full story is more nuanced. In this section, we explore what researchers have discovered about this relationship, but first dive into why empathy and conservation behaviors are so hard to study in the first place.

Studying empathy is hard for many reasons. Empathy is a complex, multifaceted concept that includes cognitive and affective components, making it hard to define and assess. As an internal emotional state, empathy cannot be directly observed or measured, meaning researchers must rely on self-reports or indirect measures that may be influenced by bias.[46] Additionally, there are different types of empathy based on context. For example, with wildlife conservation, we might need to think about empathy for zoo animals, empathy for wildlife, empathy for nature, and empathy for specific animal species.

Similarly, conservation behaviors are challenging to study because human behavior is complex and has multiple, everchanging causes. It unfolds over time rather than existing as a single snapshot, often lacking distinct start and end points.[47] Environmental behaviors like conservation action and caring are tricky to measure because what people say they do (like recycling or saving energy) often doesn't match what they do in real life. Plus, it's hard to tell if someone did something to intentionally help the environment or for other reasons, like saving money or because they think such behavior is socially or culturally desirable.[48]

How Strong is the Evidence?

For this guide, we sought and reviewed research and evaluation that looked at how empathy impacts conservation action and caring behaviors. While our focus was on conservation action and caring behaviors specifically, we also included studies examining pro-environmental behavior more broadly, as these areas are closely linked. In the end, we found limited research exploring empathy and caring behaviors and note this as a research gap.

During our search, we were interested in studies taking place in zoos and aquariums, but also reviewed studies in other settings. While we aimed to identify relevant research across multiple disciplines and contexts, our review represents a focused examination of selected studies rather than an exhaustive systematic review of all available research. The growing body of research on empathy, wildlife conservation, and caring behaviors reveals both opportunities and challenges. The reviewed studies demonstrate promising connections and highlight important considerations that need further investigation. For a full listing and details of relevant studies we identified and reviewed, please see Appendix B.

Across the studies, researchers used many different types of approaches and methods including surveys asking about direct behaviors; self-reported actions and behavioral intentions; experimental studies manipulating empathy levels; case studies; and qualitative interviews exploring empathy-action connections. There is fascinating research exploring the biological underpinnings of empathy and action where scientists study patterns of brain activity through neuroimaging techniques.[49,50] Three review papers gather relevant evidence, further strengthening the case for empathy leading to conservation action and/or pro-environmental behaviors.[51,52,53]

In addition to a mix of study designs and data, the strength of this evidence is enhanced by the geographic diversity of study locations. Studies spanned six continents including research conducted in Australia, China, Ecuador, Namibia, Spain, and the United States. These findings held true whether researchers conducted careful experiments in labs or observed people in real-world settings. While most of the studies did not focus on people taking part in a zoo, aquarium, or other free-choice learning visit, a handful of studies did. Four studies involved visitors to zoos,[54,55,56,57] two studies included aquarium visitors,[58,59] and four studies focused on participants in other free-choice learning environments, namely marine wildlife experiences [60,61,62] and a citizen science project.[63]

In general, key findings show that people with higher empathy for nature and wildlife are often more likely to engage in behaviors that support wildlife conservation and caring behaviors. These behaviors include:

- Making financial contributions to conservation efforts, such as donating to wildlife protection organizations, paying premiums for wildlife-friendly products, and supporting environmental nonprofits.
- Taking direct conservation action, including volunteering with conservation organizations, participating in wildlife monitoring, and engaging in habitat protection activities.
- Adopting wildlife-conscious consumer behaviors, such as avoiding illegal or unsustainable wildlife products and choosing sustainably sourced seafood.
- Showing greater tolerance for wildlife in human-dominated spaces, including accepting wildlife proximity to human settlements, supporting coexistence strategies, and being more accepting of wildlife-related costs or inconveniences.
- Practicing responsible wildlife viewing behaviors, such as maintaining appropriate distances from animals, following wildlife viewing guidelines, and reporting inappropriate behaviors of others.

In free-choice learning settings like zoos, aquariums, and marine wildlife tours, common outcomes included changes in visitor behavior, increased support for conservation programs, and enhanced understanding of human-wildlife relationships.

While we encourage you to review the complete list of studies in Appendix B, let's examine three key studies that are often referenced in research linking empathy and wildlife conservation:

- One study examined how having people emotionally connect with nature influenced their environmental concern by conducting an experiment with 180 university students in the United States. Participants were shown different types of images (people in nature, animals in nature, or animals being harmed by pollution) and were either asked to imagine the perspective of the people or animals or remain objective while viewing them. The key finding was that when participants were asked to take the perspective of animals being harmed by pollution, rather than just viewing the images objectively, they showed higher levels of environmental concern.[64]
- In a similar study, researchers found that when people were asked to imagine how a bird covered in oil or how a tree being cut down might feel, they developed stronger positive feelings toward nature and were more willing to support environmental causes. The study, conducted with university students in Spain, showed that this simple act of empathizing with nature led participants to donate more money to environmental protection.[65]
- Research conducted in Hong Kong found that people have different levels of empathy for nature and this trait is separate from how much empathy they feel toward other humans. Through a series of studies with over 800 participants, researchers discovered that people who had higher levels of empathy for nature were more likely to engage in pro-environmental behaviors, like recycling or supporting environmental organizations.[66]

Building on this foundational research, contemporary studies from diverse global contexts further show the empathy-conservation connection:

- In the United States, researchers conducted a study showing that people who could better identify individual dolphins not only displayed higher empathy for them but were also more willing to take real-world conservation actions.[67]
- Researchers in Namibia reported that empathy was a consistent driver of wildlife tolerance across multiple studies, even in areas where humans and wildlife are in frequent conflict with each other.[68,69,70]
- In China, scientists used neuroimaging to show that empathy for nature influenced green purchasing decisions, with participants showing distinct neural responses when making environmentally conscious choices.[71]
- A study of Ecuadorian children found that empathy with endangered animals was a strong predictor of their willingness to protect species like the Andean condor, demonstrating how empathy influences conservation attitudes even in young people.[72]

And finally, the relationship between empathy and conservation action is further supported by studies in zoos, aquariums, and other free-choice learning environments. These studies include:

- Interviews with 40 zoo visitors revealed interesting nuances in how empathy manifests. Visitors often experienced positive emotional empathy when viewing animals at the zoo, but felt more negative motivational empathy and concern when thinking about the challenges these animals face in the wild, highlighting the complex relationship between empathy and conservation motivation.[73]

- A survey of 264 zoo and aquarium visitors found significant relationships between empathy for animals, environmental self-efficacy, and intentions to take conservation action.[74]
- A study of whale-watching experiences in Australia and Tonga reported that empathy was linked to stronger conservation intentions, especially when visitors had close encounters with whales or made eye contact with them.[75]

What Gets in the Way?

With all this evidence supporting a link between empathy and conservation action, the recipe to get people to act seems simple: combine people, animals, and empathy and get behaviors to support wildlife conservation. But we know in practice, things are not that easy! Several barriers can arise that prevent empathy from translating to action.

Empathy-Specific Barriers: People can experience "empathy fatigue" when they become overwhelmed by repeated exposure to wildlife suffering, and may disengage rather than take action.[76,77] Another challenge emerges when people over-personify wildlife, attributing human characteristics to animals in inaccurate ways that can reduce understanding of their natural behaviors and ecological roles.[78] Additionally, even well-meaning empathy can sometimes work against conservation goals. For example, strong emotional connections to wildlife might lead people to oppose necessary management practices[79] or make problematic choices like keeping wild animals as pets.[80] Understanding these barriers helps us develop more effective approaches to channeling empathy into meaningful conservation action.

Context Counts: The research also highlights how cultural and social factors influence if and how empathy develops and translates to action.[81] Cultural values and beliefs help shape how people understand and respond to human-wildlife relationships, impacting empathy for wildlife and eventual action to protect wildlife.[82,83] The broader social environment plays a crucial role, with social norms[84] and community support[85] affecting whether empathy leads to sustained behavior change.

Personal context plays a crucial role too. Research emphasizes that empathy works alongside other important motivators such as knowledge and understanding of wildlife/conservation issues,[86] personal values[87] and moral principles,[88] perceived ability to make a difference (self-efficacy),[89] and individual economic considerations.[90] The impact of personal factors underscores the value of direct experiences with wildlife, with studies demonstrating that firsthand encounters with wildlife, when paired with educational interpretation, can lead to enhanced empathy and stronger conservation intentions.[91,92]

The Knowledge-Action Gap: For many years, zoo and aquarium professionals believed that if visitors learned more about wildlife and conservation issues, they would naturally take action to help.[93] This idea, known as the "knowledge deficit model," suggested that lack of knowledge was the main barrier to conservation action.[94,95] Following this thinking, many conservation education programs focused primarily on teaching facts and raising awareness.[96,97]

However, experience and research have shown that knowledge alone isn't enough to create change. Even when people understand conservation issues well, they don't always take action to help.[98,99] This disconnect between what people know and what they do is called the "knowledge-action gap".[100] Why does this gap exist? Researchers have discovered that human behavior is influenced by many factors beyond just knowledge. Our actions are shaped by our personal values and attitudes, the social and cultural norms around us, our sense of identity, feelings of motivation and empowerment, psychological barriers, practical skills and abilities, and our emotional connections to issues and causes.[101,102,103] Rather than simply providing information, many zoos and aquariums now work to create more comprehensive experiences that address the multiple factors influencing human behavior.[104]

Important Considerations

While the evidence for empathy's role in conservation is strong, researchers have identified some important nuances.

Different Types of Empathy Matter: The research suggests that different forms of empathy may contribute uniquely to conservation behavior.

- **Affective empathy** creates immediate personal connections that can drive action. When people feel care and concern for wildlife, it can foster initial motivation to help. [105,106,107]
- **Cognitive empathy** provides a foundation for sustained engagement and more strategic approaches. By comprehending the complexities of wildlife issues, people can make more informed choices about how to provide meaningful support over time.[108,109,110]
- **Dispositional[111] and situational empathy[112]** may also show distinct effects. While some people have naturally higher baseline empathy for nature (dispositional), specific situations and experiences can temporarily increase empathy in most people (situational).[113] Both types can motivate conservation action but may require different approaches to sustain engagement. We note there was little research that examined the impacts of dispositional and situational empathy on conservation action or caring behaviors.
- Researchers continue to explore other types of empathy that also warrant future exploration as motivators of conservation action. These include **reflective empathy** (the ability to step back and thoughtfully consider one's empathic responses);[114,115] **motivational empathy** (the drive to take action based on empathic feelings);[116,117] **narrative empathy** (perspective-taking and shared feelings that can occur after reading, viewing, hearing, or imagining stories about others);[118,119,120] and **positive vs. negative empathy** (the distinct ways people empathize with others' positive experiences, like joy or contentment, compared to negative experiences, like suffering or distress).[121,122]

Not Always Straightforward: There is lots of evidence suggesting empathy can motivate conservation action and pro-environmental behavior, but the relationship is more complex than it might first appear. For example, rather than directly causing action, some research suggests empathy may serve as a mediator, meaning it helps translate other factors, like connection to nature,[123] into actual conservation behaviors. Think of empathy as a means of uniting what people know and believe with actions they can take to help wildlife.

Additionally, while many studies demonstrate positive relationships between empathy and conservation and environmental behaviors, there is also research with mixed or contrary results.[124,125] For example, two studies with university students found that empathy did not reliably predict either donations to wildlife causes or attitudes toward animal welfare.[126,127] In another study at a U.S. national park, signs designed to build empathy for deer were no better at stopping visitors from feeding wildlife than signs that simply warned about personal safety risks.[128] Data from a survey of Costa Rican adults suggests that misguided empathy contributes to the decision to keep wild animals as pets.[129] Several researchers have described how empathy can lead to empathy fatigue[130] or feelings of pity and sadness,[131,132] creating barriers to action and caring.[133] The research referenced in Appendix B includes studies that show a strong positive link between empathy and conservation/environmental behaviors as well as studies that paint a more complicated picture.

This complexity in the research literature suggests that while empathy is generally a valuable tool for promoting conservation action (as the majority of the reviewed studies demonstrate), its effectiveness depends on various factors, including the setting, the specific behaviors being targeted, and how empathy is cultivated. Understanding both the supporting and challenging evidence helps us develop more nuanced and effective approaches to using empathy in zoos and aquariums. When thoughtfully implemented, empathy-based approaches can be a worthwhile strategy for increasing conservation action and caring behaviors.

Part 3: Developing Empathy in Zoos and Aquariums to Support Wildlife Conservation Action

How Can We Develop Empathy in Visitors?

Now that we have a better understanding of how empathy can drive conservation action and pro-environmental behaviors, a key question emerges: How can zoos, aquariums, and other free-choice learning settings cultivate empathy in their visitors? These institutions have unique opportunities to connect people with wildlife through direct experiences, educational programming, and meaningful encounters. The research exploring empathy development in these settings provides valuable insights for practitioners looking to design and implement effective empathy-building experiences.

This section synthesizes findings from studies that have examined specific strategies, programs, and approaches for fostering empathy in visitors to zoos, aquariums, and similar environments. See Appendix C for details on selected studies that demonstrate positive outcomes for developing empathy in free-choice learning settings. These studies span various approaches—from structured educational programs to informal interactions—and offer evidence-based strategies that practitioners can adapt for their own institutions.

The research reveals three fundamental principles for fostering empathy in zoo and aquarium settings: **creating meaningful connections through direct experience, supporting perspective-taking through multiple approaches, and balancing emotional engagement with action opportunities.** These principles inform the following evidence-based strategies for developing visitor empathy.

Strategies for Developing Empathy in Zoo and Aquarium Visitors

Each of these strategies should be implemented with consideration for specific institutional contexts, visitor needs, and animal wellbeing priorities. The most effective programs typically combine multiple strategies while maintaining focus on both empathy development and conservation outcomes. Many strategies may already be part of everyday practice in zoos and aquariums!

1. **Design Thoughtful Animal Encounters:** Research consistently shows that providing opportunities for visitors to meaningfully connect with animals, whether through live encounters, interactive exhibits, or observation spaces, forms the foundation for empathy development. Animal encounters can:
    - Incorporate live animal experiences (rather than video-recorded encounters) when possible.[134]
    - Ensure that visitors see how zoo and aquarium animals have opportunities for choice and control.[135]
    - Encourage and facilitate extended periods of observation, such as through "slow seeing" opportunities.[136]
    - Create spaces and opportunities for visitors to see animals' natural behaviors.[137,138]
    - Provide opportunities for visitors to observe animal intelligence and decision-making through enrichment activities such as animal-computer interactions, puzzle feeders, and creative activities like painting.[139,140]

2. **Use Strategic Interpretation:** Research demonstrates the importance of thoughtful interpretation across all types of experiences. Zoo and aquarium professionals can:
    - Use interpretation that emphasizes individual animals' stories, experiences, and personalities.[141,142,143]
    - Utilize critical anthropomorphism, the showcasing of similarities between people and animals based on sound science, while being careful not to overly humanize animal behaviors and emotions.[144,145]

3. **Leverage Multiple Learning Modalities:** Successful empathy development requires helping visitors understand and relate to animals' experiences and perspectives. To support perspective-taking in a variety of ways, zoo and aquarium professionals can:
    - Create opportunities for hands-on learning when appropriate (e.g., facilitated, supervised touch tanks).[146]
    - Incorporate immersive technology like virtual reality to simulate animal perspectives.[147,148]
    - Augment live encounters with physical elements like realistic statues.[149]
    - Provide nature play areas that complement animal experiences.[150]

4. **Support Emotional Processing:** Research with zoo visitors found that empathy and other emotional responses influence conservation intentions, but visitors need support in processing emotions. To help initiate and maintain engagement, zoos and aquariums can:
    - Facilitate family and group conversations during and after animal encounters.[151]
    - Create reflection and relaxation spaces where visitors can take time to think and process.[152]
    - Be mindful of how anthropomorphic language is used; focus on scientifically documented capabilities and behaviors rather than assuming human-like emotional experiences.[153,]

5. **Connect to Conservation Action:** Research emphasizes the importance of managing emotional responses while providing clear pathways to action. Interpretation at zoos and aquariums can:
    - Avoid excessive focus on environmental challenges like climate change or species decline, which can lead to empathy fatigue and disengagement.[154]
    - Share clear, concrete, specific steps that visitors can take to support wildlife conservation.[155,156]
    - Help visitors understand how their efforts directly benefit animals they've connected with emotionally.[157]
    - Create clear connections between individual animals and species conservation.[158]

Lessons Learned from Experts Working in Zoos and Aquariums

Evaluations and reports from zoos and aquariums offer practical insights into implementation and assessment. Evaluation reports from multiple institutions, including Woodland Park Zoo, Zoo Boise, and Monterey Bay Aquarium, reveal key lessons about measuring and fostering empathy in real-world settings. See Appendix D for a list of the reports and evaluations we reviewed for this section (we also incorporate some of what we've learned from the research we've reviewed).

Measuring Empathy in Practice: Evaluation reports indicate that zoos and aquariums use various approaches to assess empathy development. These evaluations often examine three key dimensions of empathy: cognitive empathy, affective empathy, and behavioral empathy. Reported assessment approaches include:

- Using the Measuring Empathy Collaborative Assessment Project (MECAP) observation framework.
- Implementing semantic differential scales to track changes in visitors' emotional connections to wildlife.
- Conducting observational assessments of actual behavior during animal encounters.
- Utilizing age-appropriate evaluation methods, such as Draw-Yourself-with-an-Animal activities for young children.
- Administering pre/post surveys and interviews for older participants.

Implementation Success Factors: The evaluations and reports suggest several factors that can support successful implementation of empathy-based programming, which include:

- Customizing approaches based on species type, audience age, and program context.
- Strategically placing empathy-focused messaging throughout the institution.
- Using individual animal stories to foster broader species conservation interest.
- Training staff in empathy practices.
- Creating clear pathways from emotional connections to conservation actions.

Implementation and Evaluation Challenges: Reviewed reports highlight several challenges in implementing and evaluating empathy-focused programming, such as:

- Maintaining consistency across different staff members and programs.

- Engaging visitors with less charismatic species.
- Converting emotional connections into conservation action.
- Measuring long-term impact.

Future Directions for Implementation: Based on our review of the evaluation reports, we suggest several potential steps for improving empathy development programs:

- Developing standardized measurement tools that can be shared across institutions.
- Identifying practical ways to track long-term changes in visitors' wildlife conservation and caring behaviors following their participation in empathy-development experiences.
- Integrating digital and in-person experiences through mobile apps, virtual reality, and hybrid programming.
- Strengthening connections between empathy development and conservation action and caring through explicit interpretation that links empathy-building moments with specific, achievable behaviors.
- Enhancing comprehensive and consistent staff training programs using a multi-tiered approach, with foundational empathy training followed by more advanced training and ongoing refresher trainings.

Part 4: Empathy-Related Concepts Under Study

Our review revealed that while some studies focus specifically on empathy, many examine related concepts that capture different aspects of emotional and cognitive connections between humans and animals/nature. These concepts often overlap with elements of empathy but are conceptualized and measured distinctly. Understanding them helps illuminate how connections to wildlife develop and influence wildlife conservation action. These empathy-adjacent concepts are areas for future research and worthy considerations when designing programs and experiences.

Connection to nature emerged as the most frequently studied concept related to nature in the reviewed studies. Connection to nature is a deep feeling of being connected and unified with

nature, as if you and the natural world are one and the same.[159] Studies show that connection to nature often incorporates elements of empathy, particularly in how people relate to and care for wildlife.[160] There is a lot of research on this topic, with discussions about how to measure it[161,162] and research linking connection to nature to improved mental health,[163] social and emotional development,[164] pro-environmental behavior,[165] and conservation action.[166] Zoos and aquariums have been identified as important places for people to build their connection to nature.[167,168,169] Researchers also examine other connection concepts (e.g., **connection to animals**[170] and **connection to wildlife**[171]) and related constructs such as **inclusion of nature in self.**[172]

Researchers have explored various **emotion-related concepts**[173] that overlap with and complement empathy in potentially driving conservation action. These concepts appear under different labels—including **emotional responses,**[174,175] **affective responses,**[176] **mood,**[177] **emotional engagement,**[178] **emotional connections,**[179] and **conservation caring**[180]—but all examine the role of feelings in visitor experiences or people's other interactions with nature and animals. While these terms may seem interchangeable, researchers use them to emphasize different aspects of emotional experience. For instance, studies of "emotional responses" and "affective responses" typically focus on immediate reactions to wildlife encounters, while "emotional connections" and "conservation caring" describe deeper, more sustained emotional bonds that develop over time. These concepts align closely with the affective component of empathy (emotional empathy) but often capture a broader range of emotional experiences beyond just shared feeling states. Despite their conceptual differences, these emotion-related constructs share a common thread: they all seek to understand how emotional engagement with wildlife can motivate conservation action. This suggests that while empathy is important, it operates within a broader landscape of emotional experiences that can inspire people to

Two specific emotions have garnered particular attention in research on nature, wildlife, and conservation: **awe** and **compassion**. Awe—defined as the feeling of being in the presence of something vast that transcends our current understanding of the world—has emerged as a powerful force in nature-based experiences.[181] Research shows that experiencing awe in nature not only creates meaningful connections to the natural world but also offers significant mental health benefits, including reduced stress, improved mood, and enhanced psychological well-being.[182] Compassion[183]—understood as the feeling that arises when witnessing suffering and being motivated to help—has taken on special significance through the emergence of "compassionate conservation," a movement that explicitly integrates empathy and compassion into conservation practice.[184,185] This approach advocates for considering the welfare and experiences of individual animals alongside traditional conservation goals focused on species and ecosystems. While distinct from empathy, both awe and compassion represent emotional pathways that can deepen people's connection to nature and wildlife while motivating conservation action.

Other concepts like **environmental identity**[186] and **environmental ethics**[187] also emerged in our review and may deserve a further look at their role in spurring conservation action and their potential for development in zoos and aquariums. And finally, one intriguing empathy-related concept is **body transfer**, which is emerging from virtual reality research.[188,189] Researchers are

looking at how taking on an animal's perspective—literally through virtual embodiment—might create emotional connections with wildlife and help motivate conservation action.

These various concepts highlight the complex nature of connections between people and wildlife. While each concept approaches the relationship between people and animals from a slightly different angle, they share common elements with empathy—particularly in how they relate to the development of emotional bonds that can motivate conservation action. Understanding, measuring, and supporting these related concepts helps provide a more complete picture of how zoos and aquariums can foster meaningful connections between visitors and wildlife.

Part 5: Summary and Next Steps

This review synthesizes current knowledge about empathy's role in wildlife conservation, particularly in zoo and aquarium settings. Part 1 established empathy as a multifaceted concept involving both cognitive understanding and emotional connection, explaining its relevance to wildlife conservation and caring behaviors. Part 2 presented compelling evidence from over 30 studies demonstrating that higher empathy for wildlife is linked to increased conservation action across cultures and contexts. Part 3 detailed practical strategies for developing visitor empathy in zoos and aquariums, emphasizing the importance of thoughtful animal encounters, strategic interpretation, and clear pathways to action. Part 4 explored related concepts like connection to nature, emotional responses, and compassion, highlighting the complex web of psychological factors that influence human-wildlife relationships and conservation behavior.

Putting it Altogether

Developing empathy that leads to conservation action in zoos and aquariums starts with creating meaningful connections between visitors and animals through thoughtfully designed encounters. These experiences should allow visitors to understand natural behaviors, learn individual animals' stories, and spend time in sustained observation, while providing clear, scientifically accurate interpretation about animals' lives and conservation challenges. The power of these experiences comes from their authenticity – when visitors can see animals making choices and engaging in natural behaviors, they begin to understand them as individuals with their own lives and needs.

From research and practice, it is clear that zoo and aquarium professionals working to develop empathy face challenges from: limited time with visitors, varying visitor interest, the need to balance animal wellbeing with visitor experience, issues when measuring empathy, and concerns about how empathy work might affect public perception of zoos and aquariums. Success requires carefully managing the emotional aspects of visitor experiences, striking a balance that helps visitors connect with conservation challenges without overwhelming them. Institutions must provide immediate, achievable conservation opportunities that help visitors channel their newfound empathy into meaningful action, while ensuring staff are trained in empathy-building techniques and supported in implementing them effectively. When these elements work together – meaningful connections, supported understanding, managed emotional experiences, and clear action pathways – zoos and aquariums can create experiences that not only develop empathy but transform it into lasting conservation engagement.

Areas for Future Research

1. **Long-term Impact Studies**
   - Track how empathic connections formed during zoo/aquarium visits influence conservation behavior over time.
   - Examine what factors sustain empathy-driven conservation engagement.
   - Investigate how repeated visits affect empathy development.

2. Measurement and Assessment

- Develop standardized tools for measuring empathy in zoos and aquariums.
- Create and validate multiple methods for evaluating program effectiveness.
- Design metrics that capture both emotional connection and behavioral outcomes.

3. Differential Effects

- Explore how empathy development varies across different:
  - Species (e.g., from charismatic megafauna to less popular species).
  - Visitor demographics and cultural backgrounds.
  - Types of encounters and experiences.
  - Age groups and developmental stages.

4. Digital Integration

- Explore Investigate how virtual and augmented reality can enhance empathy development.
- Examine the role of social media in sustaining conservation engagement.
- Study the effectiveness of hybrid physical/digital experiences.

5. Barriers and Bridges

- Research factors that prevent empathy from translating into action.
- Identify effective strategies for overcoming empathy fatigue.
- Study how to build empathy for animals across cultural and social differences.
- Explore how empathy works alongside other psychological concepts like connection to nature, awe, and compassion.

Appendix A: Research on species-specific wildlife empathy

Researchers are moving beyond studying a basic connection between empathy and wildlife and are examining how empathy may or may not differ for specific groups of animals. The following studies provide examples of this research:

- Bidegain, I., Cerda, C., Silva-Rodriguez, E. A., Lopez-Santiago, C., Briceno, C., Promis, A., Razeto, J., de la Maza, C. L., & Tironi, A. (2024). Social preferences for vertebrates, invertebrates and plants: A multistakeholder approach for conservation management. *Human Dimensions of Wildlife*, *29*(5), 463–478. https://doi.org/10.1080/10871209.2023.2263774
- Castillo-Huitrón, N. M., Naranjo, E. J., Enríquez, P., Santos-Fita, D., Estrada-Lugo, E., & González-García, J. M. (2024). Feelings, conflicts, and use: Wildlife-human interactions in El Triunfo Biosphere Reserve, Mexico. *Human Dimensions of Wildlife*, *29*(4), 416–431. https://doi.org/10.1080/10871209.2023.2263471
- Castillo-Huitrón, N. M., Naranjo, E. J., Santos-Fita, D., Peñaherrera-Aguirre, M., Prokop, P., Cisneros, R., Gallegos, S. V., & Ježová, Z. (2024). Influence of human emotions on conservation attitudes toward relevant wildlife species in El Triunfo Biosphere Reserve, Mexico. *Biodiversity & Conservation*, *33*(8/9), 2423–2439. https://doi.org/10.1007/s10531-024-02863-4
- da Silva, A. R., Braga-Pereira, F., Borges, A. K. M., de Oliveira, J. V., da Silva, M. X. G., & Alves, R. R. N. (2023). Bioecological representations and social characteristics of students influence their attitudes toward wild vertebrates. *Journal of Ethnobiology & Ethnomedicine*, *19*(1), 1–14.
- Grover, E. R. (2018). *Investigating the influence of zoo exhibit design on visitor empathy for wildlife* [Master's thesis]. The Ohio State University. https://rave.ohiolink.edu/etdc/view?acc_num=osu1515095282489716
- Kansky, R., Kidd, M., & Fischer, J. (2021). Does money "buy" tolerance toward damage-causing wildlife? *Conservation and Science Practice, 3*(3), e262. https://doi.org/10.1111/csp2.262
- Miralles, A., Raymond, M., & Lecointre, G. (2019). Empathy and compassion toward other species decrease with evolutionary divergence time. *Scientific Reports*, *9*(1), 19555. https://doi.org/10.1038/s41598-019-56006-9
- Mota Pereira, H., Braga-Pereira, F., Azeredo, L. M. M., Lopez, L. C. S., & Romeu Nóbrega Alves, R. (2023). Assessing factors influencing students' perceptions towards animal species conservation. *PeerJ*, *11*, e14553. https://doi.org/10.7717/peerj.14553
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- Valença, T., Resende, B., & Savalli, C. (2021). Human–wildlife interactions with different species in a Brazilian park: A naturalistic approach. *Anthrozoös*, *34*(5), 615–631. https://doi.org/10.1080/08927936.2021.1914443

Specific research is also looking at empathy as it relates to charismatic animals. These are animals that have popular appeal and often include large mammals with features that people find attractive or relatable, such as pandas, elephants, or whales. Flagship species are charismatic animals specifically chosen by organizations and institutions to raise awareness about wildlife conservation issues. See the following studies the explore the links between empathy and charismatic and flagship species:

- Jaric, I., Normande, I. C., Arbieu, U., Courchamp, F., Crowley, S. L., Jeschke, J. M., Roll, U., Sherren, K., Thomas-Walters, L., Verissimo, D., & Ladle, R. J. (2024). Flagship individuals in biodiversity conservation. *Frontiers in Ecology and the Environment*, *22*(1), 1–8.
- Smith, P., Mann, J., & Marsh, A. (2024). Empathy for wildlife: The importance of the individual. *Ambio*, *53*(9), 1269–1280. https://doi.org/10.1007/s13280-024-02017-4
- Tal, A. (2024). A charismatic hyena: Insights for human-wildlife interaction in shared urban environments. *Case Studies in the Environment*, *8*(1), 2302549. https://doi.org/10.1525/cse.2024.2302549

On the flipside, researchers are also looking at how people may experience varying levels of empathy for animals considered to be less popular, including species that are not as well known or animals that people may be afraid of or simply dislike. See the following studies for research relevant to this topic:

- Carmi, N., Becker, N., Cohen, S., Zemah-Shamir, Z., & Zemah-Shamir, S. (2024). Shattering negative stigmas and creating empathy and willingness to advocate for unpopular endangered species: Evidence from shark watching in Israel. *Annals of Leisure Research*, *27*(4), 505–524. https://doi.org/10.1080/11745398.2022.2145977
- Greenhough, B., Roe, E., & Message, R. (2024). Amphibious ethics and speculative immersions: laboratory aquariums as a site for developing a more inclusive animal geography. *Scottish Geographical Journal*, *140*(3–4), 449–473. https://doi.org/10.1080/14702541.2024.2378308
- Knudson, H. M. (2019). *Empathy for invertebrates: Adults' empathic behaviors at aquarium touch tanks* [Master's Thesis]. University of Washington.
- Shaw, M., Dunn, M., Crowley, S., Owen, N., & Veríssimo, D. (2024). Using photo editing to understand the impact of species aesthetics on support for conservation. *People and Nature*, *6*(2), 660–675. https://doi.org/10.1002/pan3.10602

Appendix B. Research examining the relationship between empathy and conservation action or proenvironmental behavior

Study	Country	Study Design	Empathy Measured	Outcome Measured	Sample Description	Sample Size
Berenguer 2007	Spain	Experimental	Empathic feelings	Willingness to support an environmental protection organization	University students	60
Borland 2022	Japan	Historical case study	Empathy	Public support for saving an endangered animal	General public	NA
Büscher et al. 2023	Ecuador	Survey	Dispositional empathy with endangered animals	Willingness to protect endangered animals	4th grade students	154
Czap et al. 2015	United States	Experimental	Empathy nudges	Levels of conservation tillage	General public (adults)	400
Fuhrman 2007	United States	Experimental	Empathy for birds	Behavioral intentions to support wildlife conservation	Members of retirement communities	213
Geiger et al. 2017	United States	Experimental	Empathic responses	Neural correlates of environmental concern	General public (adults)	29
George 2016	United States	Survey	Empathy, Animal empathy	Concern about animal welfare	University students	325
Ghasemi & Kyle 2021	United States	Survey	Empathy for wildlife	Behavioral intentions to support wildlife conservation	University students	1278
Govaerts & Altintzoglou 2024	Norway	Survey	Empathy towards fish	Intention to buy seafood from sources that	General public	416

Study	Country	Study Design	Empathy Measured	Outcome Measured	Sample Description	Sample Size
				prioritize fish welfare		
Hagen & Gould 2022	United States	Interviews	Empathy towards nature	Relational values	Watershed residents	16
Harris et al. 2023	United States	Case study	Empathy for animals	Place attachment	High school students	33
Heinz & Koessler 2021	Various	Review	Other-regarding preferences (including empathy)	Pro-environmental behavior	Various	NA
Hockett & Hall 2007	United States	Experimental	None, used empathy intervention	Deer feeding beliefs and behaviors	Campers at national park	342
Jacobs & Harms 2014	Spain	Experimental	None, used empathy intervention	Whale conservation intentions	Participants of whale-watching tours	146
Jing et al. 2022	China	Experimental	Empathy with nature	Preference for green household products	University students	39
Johnson 2020	United States	Survey	Empathy for animals	Intent to take conservation action	Zoo and aquarium visitors	264
Kansky & Kidd 2024	Namibia	Survey	Empathy for wildlife	Tolerance for wildlife	Farmers in communities in/near conservation areas	554
Kansky & Maassarani 2022	Namibia	Case study	Empathy for wildlife	Tolerance for wildlife	Participants of a workshop dialogue series in conservation areas	54
Kansky et al. 2021	Zambia	Survey	Empathy for wildlife	Tolerance for wildlife	Farmers in communities in/near conservation areas	286
Li et al. 2024	China	Survey, Experimental	Empathy with	Proenvironmental attitudes	Preschool students	184

Study	Country	Study Design	Empathy Measured	Outcome Measured	Sample Description	Sample Size
			humans, empathy with nature			
Liu 2023	China	Experimental	Dispositional empathy with nature	Environmental attitudes, environmental intentions	University students	347
Lokke 2021	United States	Interviews	Empathy	Proenvironmental action	Zoo visitors	40
Maguire et al. 2020	Australia, Kingdom of Tonga	Experimental	Empathy towards wildlife	Conservation behavior	Participants of whale-watching/swim with whales experiences	45
Moriuchi & Murdy 2022	United States	Experimental	Empathy	Attitude toward helping endangered species, Attitude toward helping conservation, Willingness to donate to endangered species conservation	General public, University students	268
Muller et al. 2021	United States	Survey	Empathy with animals	Perceptions of zoo animal well-being	Zoo and aquarium visitors	201
Pearce et al. 2021	Western Europe	Experimental	Empathy for animals	Proenvironmental behavioral intention	9–12-year-olds	238
Schultz 2000	United States	Experimental	Perspective-taking	Concern for environmental issues	University students	180
Sherman et al. 2024	United States	Interviews	Empathy	Perceptions of animal well-being	Zoo visitors	37
Smith et al. 2024	United States	Experimental	Empathic concern, empathy for injured dolphin	Pledge to take real world conservation action	General public	2132

Study	Country	Study Design	Empathy Measured	Outcome Measured	Sample Description	Sample Size
Swim et al. 2023	United States	Experimental	Empathy choice preferences	Willingness to donate to an animal welfare organization	University students	375
Tam 2013	Hong Kong	Survey	Dispositional empathy with nature	Conservation behavior	University students	817
Taylor & Signal 2005	Australia	Survey	Human-to-human empathy	Attitudes towards animals	University students	194
Telle & Pfister 2014	Germany	Survey, Experimental	Empathy for animals	Donation to wildlife conservation	University students	526
Young et al. 2018	United States	Review, Interviews	Empathy for animals	Pro-environmental behavior	NA	NA
Yue et al. 2021	China	Experimental	Empathy for wildlife	Wildlife conservation intentions	University students	385
Zeppel 2008	Various	Review	Emotional empathy	Onsite behavior change and intentions to engage in marine conservation actions	Participants of marine wildlife tours	NA

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APPENDIX C. RESEARCH EXAMINING INTERVENTIONS TO DEVELOP EMPATHY IN VISITORS

Study	Country	Intervention	Sample Description	Sample Size
Bexell et al. 2013	China	Conservation education camps at zoos	8–12-year-old, overnight zoo campers	60
Clayton & Le Nguyen 2018	Canada	Directing people to focus on similarities or differences between animals and humans	University students	58
Ernst & Budnik 2022	United States	zoo-based nature preschool	Preschool students	10
Faris 2011	United States	Playing in a zoo setting	Children playing in a zoo setting	97
Fuhrman 2007	United States	Birds of prey presentations	Members of retirement communities	213
Grover 2018	United States	Various designs of zoo exhibits	Zoo visitors	119
Harris et al. 2023	United States	Nature-based citizen science experience	High school students	10
Hockett & Hall 2007	United States	Messaging on signage	Campers at a national park	342
Huynh et al 2024	Vietnam	Ecotour with turtle encounter	Ecotourists	403
Kansky & Maassarani 2022	Namibia	Nonviolent communication training	Adults living near conservation areas	54
Khalil 2023	United States (Review)	Inviting zoo and aquarium visitors to learn about technology used with animals	NA	NA
Knudson 2019	United States	Encounters at aquarium touch tanks	Aquarium visitors	258
Lokke 2021	United States	Observing animals during typical zoo visit	Zoo visitors	40
Luebke 2018	United States	Observing animals during typical zoo visit	Zoo visitors	825

Study	Country	Intervention	Sample Description	Sample Size
Maguire et al. 2020	Australia, Kingdom of Tonga	Whale encounters	Participants of whale-watching/swim with whales experiences	45
Miller et al. 2020	United States	In-person vs video recorded animal experience	Adult zoo members	124
Minarchek et al. 2021	United States	Interpretative messaging and animal handling in animal ambassador programs	Members of a zoo's email contact list	1185
Moriuchi & Murdy 2022	United States	Virtual reality tool	University students, General public (adults)	268
Ponto et al. 2023	United States	Virtual experience	Students, age 8-13	43
Schueler & Newberry 2020	United States	Choice of name for animal ambassadors	Attendees of a traveling raptor education program	51
Tobin 2024	United States	Reminiscing with caregivers about zoo visits	Young children and their caregivers	12
Webber et al. 2017	Australia	Observation of animal-computer interaction	Zoo visitors	25
Webber et al. 2022	Australia	Observation of animal-computer interaction	Zoo visitors	140
Whitehouse et al. 2018	Various (Review)	Animal ambassador programs	NA	NA
Wilson et al. 2022	United States	Animal statues in zoos	Zoo visitors	416

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APPENDIX D. SUBMITTED EVALUATIONS AND REPORTS

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