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Perceptions of wildlife in rehabilitation from images and statements

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People form perceptions of the approachability of wild animals from images and statements pertaining to non-domestic animals under human care. The exact perceptions have been previously studied in primates. A survey using constructed images and statements about wild animals in care was circulated via email and social media to stakeholders in wildlife rehabilitation. Respondents were asked to categorize each statement or image as representing a pet, education animal, or a releasable wild animal. The results, specifically the finding that 94% of the respondents chose wild animal when presented with a best-practice image, supported our hypothesis that best-practice images and technical names provoked perceptions that the animals were releasable wild animals. Contrary to our hypothesis that not-recommended practices and anthropomorphic labels would lead to perceptions of the animals as pets, we instead found that these scenarios produced an ambiguous grouping of the categories by the respondents. When presented with an ambiguous image, 48% of the respondents labeled it as a pet and 42% labeled it as a wild animal. Practitioners of wildlife rehabilitation should always use clear technical language and employ best-practice images in their public communications to appropriately portray the animals as wild denizens temporarily in care.

KEYWORDS

wildlife rehabilitation, social media, best practices, communication with public, perceptions, human dimensions, wildlife

1 Introduction

In our media-saturated, electronically connected world, people observe wildlife via images visible on their screen. Individuals who have never seen a live tiger, bear, or eagle, either in the wild or in a zoo, know them by pictures in social media, commercials, films, and documentary close-ups. We identify and empathize with these images and portrayals, forming often unrealistic expectations of animal behavior (Bousé, 2003).

Wildlife images appear in many spaces and contexts, such as in the social media accounts of wildlife carers. The portrayal of temporarily captive wild animals affects public perception of wildlife rehabilitation and animals; these perceptions may have long-standing consequences for the carer's profession and wildlife. Studies focusing on nonhuman primates have shown that images of primates in humanized settings can lead to a misunderstanding of the status of these animals in the wild and increase the appeal of some species as pets (Leighty et al., 2015; Kitson and Nekaris, 2017; Freund et al., 2021). Recently, studies of other species, such as felids, snakes, parrots, kangaroos, insects, and sloths, have been published with less clear conclusions (van der Meer et al., 2019; Shaw et al., 2021; Spooner and Stride, 2021; Cronin et al., 2022; Alba

et al., 2023). Some authors consistently report that more research is needed in this area (van der Meer et al., 2019; Otsuka and Yamakoshi, 2020; Thomas-Walters et al., 2020; Shaw et al., 2021; Alba et al., 2023). There is a lack of scientific data and understanding of how images of native wildlife in wild and human settings are perceived, and consequently, the consequences of such imagery are unknown.

The public turns to the internet for assistance if they spot any sick, injured, or orphaned wildlife. Search engines show imagery and methodology for hand-rearing and captive care that may not be congruent with professional practices. If the public sees images of wildlife in laps, on shoulders, being kissed, and being housed alongside routinely used household items or domestic pets on wildlife rehabilitation websites, then can rehabilitators expect the public to differentiate between a wild animal and a pet in their perceptions and actions? This study investigates the perceptions of pictures and statements related to wildlife rehabilitation by asking the following question: Do terminology and imagery presentation affect people's opinions of an animal's status (pet, releasable wildlife, or education animal)? We hypothesize that animals in anthropogenic images and statements would be perceived as pets. Animals represented in technical and common images and statements would be perceived as releasable wildlife or education animals. We formed this hypothesis based on our personal experience of talking to numerous members of the public encountering wildlife, and our hypothesis was supported and strengthened by our initial literature review, especially findings from the perceptions of primates in anthropogenic situations (Ross et al., 2008, 2011; Schroepfer et al., 2011; Nekaris et al., 2013; Leighty et al., 2015).

We did not find any studies on obtaining wildlife care information online from our literature review. Conversations with wildlife rehabilitators and our personal experience include numerous instances of the members of the public finding information online. When they are unable to reach a wildlife rehabilitator directly, they use that information to care for a found animal. In best-case scenarios, this care involves keeping it in a warm, dark quiet area while awaiting a return call from a wildlife rehabilitator, but in other circumstances, this situation leads to caring individuals feeding young animals an unsuitable diet for weeks or wrapping an injury with duct tape. While studies discussing online wildlife care information were not available, research on internet medical misinformation has been performed in the human health arena. A review article found that extensive harm can be caused by medical misinformation, especially when it spreads virally via social media (Swire-Thompson and Lazer, 2020). Misperceived images that wildlife rehabilitators share online can be as dangerous for wildlife welfare as other forms of misinformation.

The research on the perceptions of wildlife primarily is concerned with understanding why certain animals are protected, used, or disregarded. Stephen Kellert has explored this realm extensively; the esthetics of a species, its socioeconomic impact, our cultural history with the species, and the relation of the species to human health all influence whether a given population will protect the species (Kellert, 1983). Similarly, other researchers have found that urban, suburban, and rural populations have different perceptions of wildlife (Mankin et al., 1999; Leong, 2009) although Hare, Daniel, and Blossey's recent study on Scottish deer found that attitudes and values are similar between the urban and rural populations (Hare et al., 2021). A study on YouTube videos and public wolf tolerance found that social media consumption, not demographic attributes, may be a primary influencer of attitudes, perceptions, and behaviors (Casola et al., 2020). Research suggests that perceptions, attitudes, and behaviors are affected by multiple levels of cultural and sociodemographic interactions (Gangaas et al., 2015; Dietsch et al., 2016). There is also evidence from this realm of research that our perception of wildlife does not necessarily represent reality but a social construction framed by an amalgam of overlapping and sometimes contradictory beliefs (Corbett, 2006; Leong, 2009).

Wildlife rehabilitators may argue that any media interest in engaging a species, especially in proximity to humans, will further the public's support for its conservation and non-profit funding. Social media can be used to increase conservation awareness (Wu et al., 2018), and updates on social media receive more attention when animals and humans are in proximity to humans (Otsuka and Yamakoshi, 2020; Spooner and Stride, 2021). However, people who were surveyed after watching the chimpanzee conservation advertisements were most likely to consider chimpanzees endangered, unsuitable as pets, and inappropriate to be covered in the media when compared to people watching chimpanzees in product commercials or clips of chimpanzees in the wild (Schroepfer et al., 2011):

> …There was no positive effect of chimpanzee commercials. Perhaps most alarming is the finding that over 35% of those watching entertainment condition thought private citizens should have the right to own a chimpanzee as a pet – in comparison to 10% in the other conditions. This increase in approval is likely related to misperceptions created by chimpanzee commercials about the size, desirability and abundance of chimpanzees (Schroepfer et al., 2011).

In a 2013 study, researchers analyzed the comments posted on a viral video of a slow loris, which attracted millions of viewers over a range of websites. The slow loris in the video raised its upper limbs when being "tickled," which despite being a stress response in the species seems charming to many humans. The videos evoked desire in people to keep a slow loris as a pet, as evident from the comment "I want one." This comment were refuted by other comments pointing out that keeping slow lorises was illegal and that they were endangered and venomous (Nekaris et al., 2013).

> The [loris] example demonstrates that care needs to be taken when using a social media site as a medium of communication to ensure that the awareness message is clear and cannot be taken out of context easily. This is particularly important amongst a human population which does not have a high level of conservation awareness or understanding of conservation or animal welfare issues (Waters and El-Harrad, 2013).

The majority of the public does not have a strong knowledge of the behavior and ecology of wild animals (Kellert, 2011). Recent research on the impact of social media message framing on wolf tolerance revealed that positive framing was more effective than negative framing (Casola et al., 2020). The way social media communications are framed impacts perceptions.

The perceptions of non-primates in association with humans are the subject of investigation in recent research. A 2022 study in Australia sampled two communities, zoo visitors and general public,

on their perceptions of the images of one of the four species in various proximities to humans. "This study highlights that the perceptions drawn from viewing close-encounter images can differ based on the animal featured, the human's presence and position in the frame, and the audience viewing the photograph" (Shaw et al., 2021). There are considerable challenges and complexities in interpreting data regarding human perceptions of wildlife images (Thomas-Walters et al., 2020). A 2019 study on wild cats interacting with humans found differences between individuals' perceptions of wild cats and their intentions to interact with them (van der Meer et al., 2019).

Recent research into human dimensions of wildlife management has found a trend toward mutualism. This trend has been argued to increase anthropogenic perceptions, but those perceptions are mediated by existing values (Manfredo et al., 2020). Mutualism increases compassion toward individual animals (Alba et al., 2023). Images are specifically considered to be powerful motivators (Thomas-Walters et al., 2020) with the ability to "trigger considerations" nuanced by previous values and attitudes (Domke et al., 2002). These interactions explain the complexity of interpreting perceptions of wildlife images (Thomas-Walters et al., 2020; Shaw et al., 2021), especially based on a single, short-term viewing. Several researchers have pointed out the need to consider cumulative impacts of viewing (Cronin et al., 2022) as well as attitudes and behavioral consequences over time (Alba et al., 2023; van der Meer et al., 2019). Wildlife rehabilitators often use behavioral change methods to encourage action among members of the public who already care about wildlife. Wallen and Daut note that a population that is already aligned will be more likely to change their behaviors (Wallen and Daut, 2018). This highlights the need for wildlife rehabilitators to be visually consistent with their messaging.

Wildlife rehabilitators interact frequently with the public and can be considered one of the more visible faces of wildlife conservation and welfare work. Interactions occur when people bring wildlife to them for aid, speak with them during educational programming, view the images of wildlife rehabilitation on social media, and watch TV shows featuring wildlife rehabilitation. Based on the findings of primate research and other perception studies, the portrayal of temporarily captive wild animals likely affects public perception of animals that are in wildlife rehabilitation, and these perceptions may have long-standing consequences for the profession and wildlife. Changing the way wildlife rehabilitators and other wildlife communicators portray animals while in temporary captivity has the potential to decrease misinformation and improve welfare and conservation outcomes. Research on stakeholder perceptions of images is also useful to policymakers and regulators in framing legislation and regulations regarding wildlife rehabilitation.

2 Methods

We designed a survey to understand the impact of imagery and language on individuals viewing wildlife rehabilitation-related web media. The survey asked respondents to consider 10 images and 9 statements and select their perception of the status of the animal – pet, education animal, or releasable wild animal – based solely on what was read or seen in the survey. We define education animal as a permanently captive wild animal whose captive purpose is to help people connect to their local wildlife based on visual interaction with an individual animal and as an ambassador for their species and the environment. Since we did not include this definition in the survey, respondents may have used their own definition, which might not be consistent with our expectation. In addition, we asked the respondents to describe the purpose of wildlife rehabilitation, state their role in wildlife rehabilitation, state what prerequisites were required to be a wildlife rehabilitator, and indicate their location. This study does not examine this data.

The survey was created via SurveyMonkey and distributed by social media and email. We solicited survey responses from the public, government agents, professional animal caretakers, and wildlife rehabilitators. The audience who responded initially included subscribers to wildlife rehabilitation newsletters, individuals who liked, followed, or were members of wildlife-related Facebook and LinkedIn pages or groups, and individuals who had the survey forwarded from an associate who saw the survey on one of the social media outlets. The response sample was appropriate as we were specifically interested in the perceptions of people who have an interest in wildlife and who would be visiting wildlife and wildlife rehabilitation-related sites. Responses were gathered from 17 March 2014 to 16 April 2014.

The statements used in the survey were crafted with nouns and descriptive language involving anthropomorphic, common, or technical terms. Images were constructed to illustrate a spectrum of wildlife rehabilitation practices from not-recommended to recommended. Not-recommended practices contained human and domestic animals interacting intimately with wildlife; ambiguous practices were images in a domestic setting, often with no personal protective equipment used; and recommended practices included specialized equipment and settings. Search engines were used to identify several of the images, and others were taken by one of the authors and staged to fit the criteria. Permission was received to use the pictures in the context of the survey, and credit was given when applicable.

Survey responses were reviewed separately and as aggregations of each category. Statistical tests were completed on the aggregated results. Data were analyzed in SPSS using the Kruskal–Wallis and pairwise *post hoc* tests by comparing the categories of practice, name type, and information type against the dependent respondent's answers of pet, education animal, or releasable animal. The raw numerical data and percentages were reviewed for each individual scenario. For the Kruskal–Wallis test, our dependent data were run as an ordinal scale of one to three (least to most wild), with pets being the least wild and releasable animals being the most wild.

3 Results

A total of 610 individuals responded to the survey. Respondent roles were grouped into four categories: public ($n = 165$), volunteers ($n = 145$), paid and unpaid rehabilitators ($n = 168$), and other wildlife professionals ($n = 132$). For respondents who reported more than one role, it mostly involved wildlife rehabilitation, which was used for analysis; if a person selected transport wildlife to a rehabilitator and employed by a rehabilitator, only the latter would be used in the analysis.

Animals in images showing the best practices were selected as the most wild (releasable). Animals shown under not-recommended

practices had the highest percentage of least wild (pet). Ambiguous practices are much more closely grouped (Figure 1). We ran a Kruskal–Wallis test with the results ($X^2(2) = 1{,}331.929$; $p < 0.001$) or ($X^2(2) = 1{,}331.929$, $p < 0.001$) and the subsequent *post-hoc* pairwise test to determine that the difference between mean ranks was significant between all groups to a level of p of <0.001. *Post-hoc* pairwise comparisons of practices found the following ranks and p-values: not-recommended (mean rank = 2,223.51) and ambiguous (mean rank = 2776.05) ($p < 0.001$); not-recommended (mean rank = 2,223.51) and best (mean rank = 4,093.57) ($p < 0.001$); and ambiguous (mean rank = 2776.05) and best (mean rank = 4,093.57) ($p < 0.001$).

Technical and common labels associated with releasable animals and anthropomorphic names were most often related to education animals (Figure 2). We ran a Kruskal–Wallis test with results ($X^2(2) = 718.304$, $p < 0.001$) and subsequent pairwise *post-hoc* test to determine that the difference between mean ranks was significant between all groups to a level of $p < 0.001$. Pairwise *post-hoc* comparisons of name type found the following ranks and p-values: anthropomorphic (mean rank = 1,975.82) and common (mean rank = 2,905.08) terms ($p < 0.001$); anthropomorphic (mean rank = 1,975.82) and technical (mean rank = 3,132.71) terms ($p < 0.001$); and common (mean rank = 2,905.08) and technical (mean rank = 3,132.71) terms ($p < 0.001$).

Anthropomorphic information had the highest response level for releasable wild animals (Figure 3). According to the results of the Kruskal–Wallis test ($X^2(2) = 16.289$ $p < 0.001$), we reject the null hypothesis that there is no difference between distributions based on the statement information type. *Post-hoc* pairwise comparisons with adjusted p-values show the statistical differences between anthropomorphic (mean rank = 2,776.61) and common (mean rank = 2,611.30) terms ($p = 0.001$) and between anthropomorphic (mean rank = 2,776.61) and technical (mean rank = 2,622.94) terms ($p = 0.002$) but no difference between common (mean rank = 2,611.30) and technical (mean rank =2,622.94) terms ($p = 1$).

In viewing the best-practices image of a cottontail rabbit being syringe fed with nitrile exam gloves, 567 of the 606 respondents (94%) chose it as a releasable wild animal. The not-recommended image of a woman kissing a squirrel had 114 of the 601 respondents (19%) identifying it as a releasable wild animal and 382 (64%) choosing it as least wild (pet). The ambiguous image of a neonatal squirrel nestled in a woman's cleavage had 249 of 597 respondents (42%) choosing it as a pet and 289 (48%) choosing it as a releasable wild animal.

Straightforward technical information elicited higher responses of releasable wild animals in relevant scenarios, as with the statement, "The Eastern Cottontail has just opened her eyes," where 88.96% of

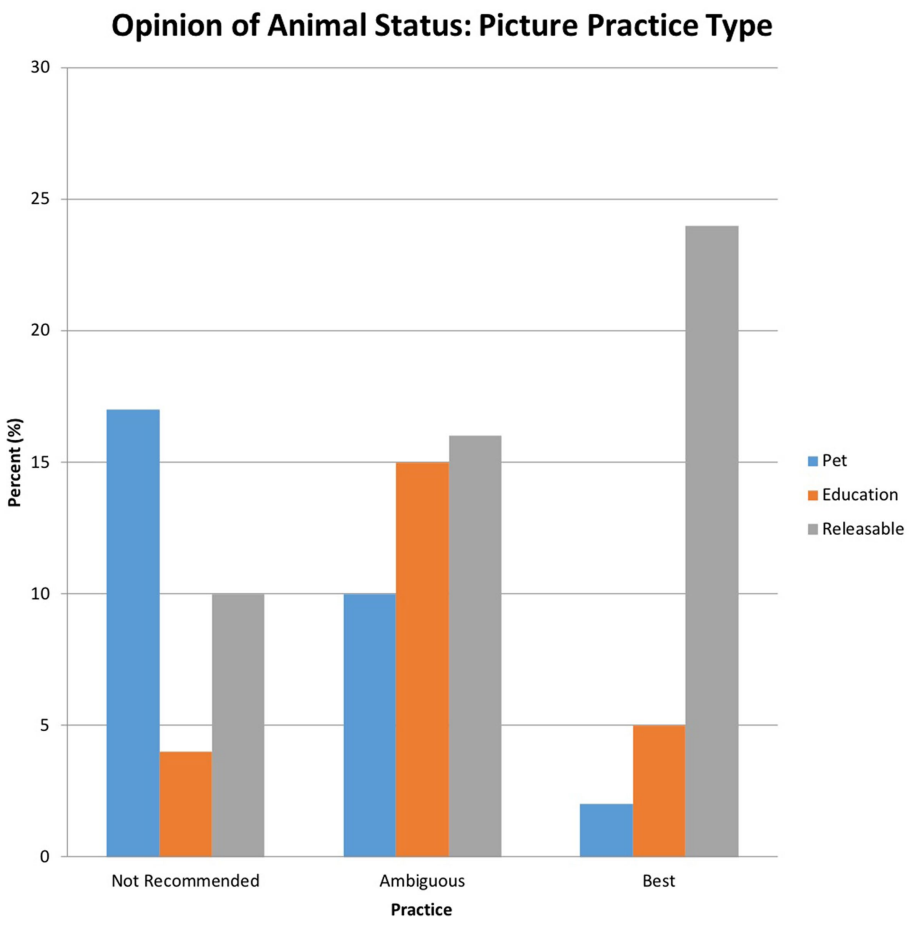

FIGURE 1
Participant responses to pictures, aggregated by practice type, show that the best-practice images lead to perceptions that pictured animals are releasable.

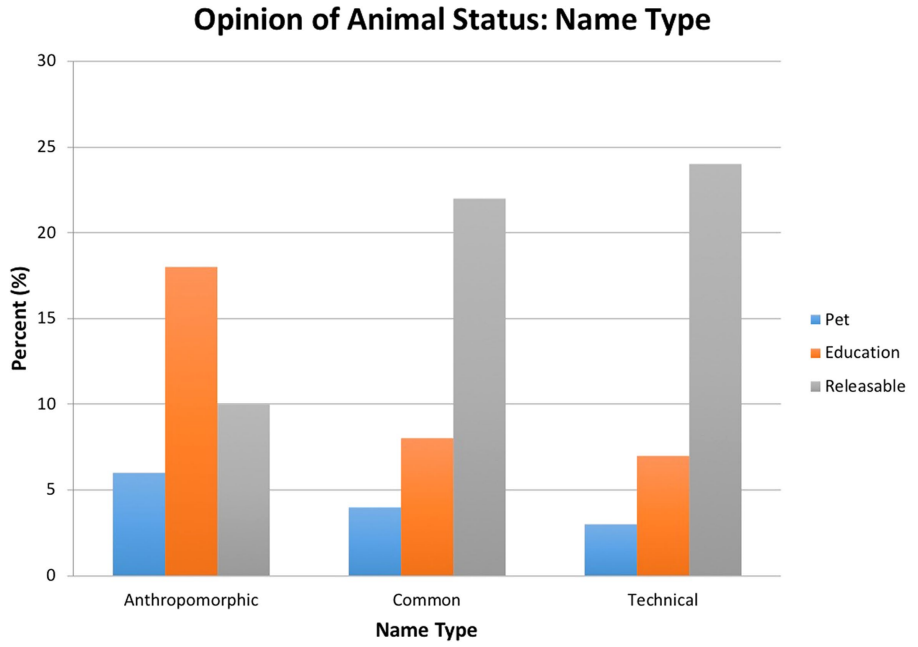

FIGURE 2
Participant responses to statements, aggregated by label type, demonstrate that using names leads many people to perceive the animal as an education animal.

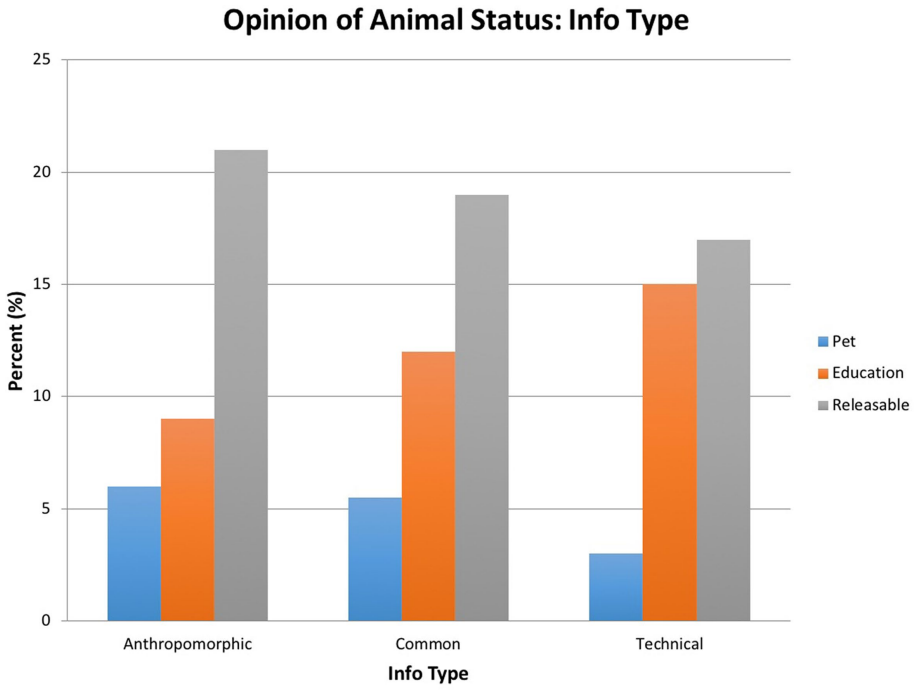

FIGURE 3
Participant responses to pictures, aggregated by information type, shows that the highest number of perceptions of releasable animals was associated with anthropomorphic information.

the respondents selected it as a releasable wild animal. For the more anthropomorphic statements such as "Edgar Allen crow is feeling icky," the response was divided, with 22.56% of the respondents perceiving the animal to be a pet, 38.55% suggesting it to be an education animal, and 38.89% indicating it as a releasable wild animal (online Appendixes).

4 Discussion

Responses to both the statements and the images demonstrated that, when images and statements were clearly technical, the respondents perceived the animal in the scenario to be a releasable wildlife. The images provided evidence that pictures of not-recommended practices (i.e., kissing, leash, housing wildlife with domestics) would cause the animal to be perceived as a pet. However, more ambiguous pictures had almost an equal number of respondents perceiving the animal in the image to be a pet as they did for the releasable wild animal.

The practice pictured in each image had an impact on the respondent's choice of animal status. When best practices were displayed, animals were viewed as releasable; animals shown under not-recommended practices were much more likely to be seen as pets (Figure 1). This finding stresses the importance of using personal protective equipment, proper handling techniques, and befitting enclosures in the imagery. Maintaining professionalism helps distinguish the appropriately permitted wildlife rehabilitator from the non-permitted members of the public keeping wildlife in captive care without the knowledge, skills, or resources to care for them.

When best practices are not followed, people tend to apply their existing socially constructed perception of wildlife. This social construction is evident not just in our findings but also in research on the perceptions of primates in media images. An insightful finding reveals that significantly fewer people consider chimpanzees endangered as compared to other great apes; the primary reason reported was seeing chimpanzees on television and in the movies (Ross et al., 2008). A follow-up study showed individual images of chimpanzees in a variety of settings: office, white background, modern zoo, and jungle; with and without humans; and several other variations. Chimpanzees portrayed near humans and in office settings were significantly more likely to be seen as not endangered. The presence of a human near the chimpanzee increased the appeal of the animal as a pet by 30%. Interestingly, zoo settings were the only location that affected the perceptions of the animal as an appealing pet. Chimpanzees viewed in this location were decidedly less appealing as a pet (Ross et al., 2011). A similar study examining the perceptions of primate species in different settings found that species depicted in anthropomorphic situations increased their appeal as a pet and decreased the perception that the species is endangered (Leighty et al., 2015). A 2019 study at a WAZA facility that considered a variety of species found that the keeper and animal pictures increased the desire for pets but did see the strongest anti-pet attitudes when people were shown a picture of the animal in a wild setting without humans present (Spooner and Stride, 2021).

The type of label given to the animal had an impact on the respondent opinions of an animal's status. Technical and common labels were associated with releasable animals, and anthropomorphic names were most often seen as education animals (Figure 2). Rehabilitators should avoid using in-house names as it may inadvertently lead to a misunderstanding of why that animal is in captive care and increase the intent to release it.

The range between the answers were much less striking for stated information as against the pictured practice or stated animal label. Additionally, while the null hypothesis of no difference in answers between the three statement information types was proven false, the responses did not conform to our hypothesis that technical information would be most likely to induce respondents to choose a releasable wild animal. This finding may be related to the respondent categorizing the dependent variable based on the actual injury described and not just the type of term used based on comments such as, "You failed to include a column for that is labeled 'this animal should be euthanized.'" This may account for the high number of respondents who chose education animal as a response to the technical information statements. We recommend that future tests be done with statements that use different levels of technical words but with the same general meaning to avoid this issue.

General comments provided at the end of the survey suggested that, when reading the statements, respondents were considering factors outside of the survey parameters such as legality, species, or injury that impacted their decision to respond in a certain way. Responses included "I cannot 'ignore' what species are in the statements and photos…. But I know what species can legally and ethically be pets, make good ed. animals, etc. So, picking one good answer was difficult."; "I say they are all releasable; otherwise, they could be education animals. Wild animals aren't meant to be pets."; and "I did not click on pet for any of the pictures as I do not see it as a pet. I see it as humans treating a wild animal inappropriately." Respondents who self-identified as not involved (the public) were presumed to have no experience with wildlife rehabilitation. However, if they were connected closely with someone who was involved, knowledge gained through their connection may have impacted their responses.

This study did not analyze the data for any correlation between the role and response. As the comments clearly state, respondents were unable to ignore the species of the animal and injuries in their responses. Additionally, the lack of a clear definition of "education animal" may have resulted in additional differences between the respondents who shared our definition based on being in the wildlife rehabilitation community and those who constructed their own definition. While they were not analyzed, these potential differences based on prior knowledge and experience due to role should be considered in assessing the results. A further analysis of the data may show that the role impacted the responses for not-recommended and ambiguous practices, but the responses to best-practice images is unequivocal regardless of the respondent's role.

Future research should include animals of a similar age and of a situation to decrease the impact of factors external to the image and statement settings on individual answers. We also suggest research based on actual wildlife rehabilitation communication materials as opposed to experimental materials as well as a study that uses the same materials and compares a respondent audience of wildlife rehabilitation followers with one of zoological society followers, or other non-rehabilitative wildlife-oriented audiences. The relationship between the respondents' perception of the animal's status and the respondents' actions or proposed actions to the animal should also be explored with regard to welfare and conservation outcomes.

5 Conclusion

When images demonstrate the best and safest practices (personal protective equipment, proper handling techniques, appropriate caging, etc.) and terminology is technically accurate, the audience will perceive the animal to be releasable wildlife. But

the more ambiguous the image or scenario, as with the squirrel in cleavage and the 'icky' feeling Edgar Allen crow, the more likely that viewers/readers may misperceive an animal's status, applying their pre-existing values and beliefs to the situation. These perceptions may have long-standing consequences for wildlife and the carer profession. Following the precautionary principle, wildlife rehabilitators should not leave perceptions to chance but always use best practices. Unclear communication showing ambiguous or not-recommended practices may lead to members of the public incorrectly presuming that they could successfully take care of wildlife in their home. Ultimately, poor communication can lead to unnecessary animal mortality or injury, as well as endangering humans. This solidifies the importance of utilizing clear imagery and language when communicating about wildlife rehabilitation. Wildlife rehabilitators must address all communications in a professional way; representing the field in an exemplary manner and demonstrating best and safest practices so as not to be misconstrued regarding the purpose of their work. These actions decrease misinformation and can lead to better wildlife welfare and conservation outcomes.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the studies involving humans because the institution had no ethics committee at the time the survey was presented. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements because we were not aware of this best practice at the time. However, participants were asked to anonymously participate in a survey that sought data to provide the researchers with insight regarding the perceptions of wildlife rehabilitation, providing them with some understanding of the purpose of participating. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

HB conceived and designed the survey. KW analyzed the data with assistance as listed in acknowledgments. HB and KW wrote the paper. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fhumd.2024.1216121/full#supplementary-material

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