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Measuring Wild Animal Welfare Attitudes: The Attitudes Towards Wild Animal Welfare Scale

Willem W. A. Sleegers [1], David Moss [1], William H. B. McAuliffe [1], David Reinstein [1,2], Daniela R. Waldhorn [1]

[1] *Rethink Priorities, San Francisco, CA, USA.* **[2]** *School of Business and Economics, Maastricht University, Maastricht, the Netherlands.*

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Corresponding Author: David Moss, 530 Divisadero St. PMB #796, San Francisco, California 94117, United States of America. E-mail: dm4242@gmail.com

Supplementary Materials: Code, Data, Materials [see Index of Supplementary Materials]

Abstract

Wild animals suffer from many naturally occurring harms such as starvation, diseases, and conflicts with other animals, yet little research has been conducted on how people view the natural suffering of wild animals. In this paper we introduce the Attitudes towards Wild Animal Welfare (AWAW) scale. The AWAW scale consists of four subscales: caring about wild animal welfare, support for intervening in nature, idyllic views of nature, and intervention ineffectiveness beliefs. Items were pretested and verified across four preregistered studies (N = 2866). The factors demonstrated good reliability and strongly correlated with related measures, including general animal attitudes, speciesism, and support for specific wild animal welfare interventions. The idyllic view factor showed weaker correlations with other measures but was retained due to its theoretical significance. All four factors predicted a decision to give a bonus payment to a wild animal charity. Our aim is that the scale will facilitate further psychological research on wild animal welfare and, in turn, inform interventions and policies aimed at reducing the suffering of wild animals.

Keywords

wild animals, wild animal welfare, attitudes, scale development

Non-Technical Summary

Background

Wild animals face numerous challenges in their natural environments, including starvation, disease, physical injuries, conflicts with other animals, and psychological stress. While humans have increasingly recognized the suffering of domesticated and farm animals, the natural suffering of wild animals has received comparatively little attention. Philosophers have long debated our moral obligations toward wild animals, and there has been renewed scholarly attention to arguments that we should care about the welfare of wild animals and consider ways to reduce their suffering, even when that suffering comes from natural causes rather than human activities. However, little research exists on how people actually feel about wild animal welfare and what beliefs influence their attitudes.

Why was this study done?

This study was conducted to create a reliable tool for measuring people's attitudes and beliefs about wild animal welfare. This tool enables researchers to better understand whether people care about wild animals' natural suffering, if they support interventions to help wild animals, and whether idyllic views of nature and beliefs related to the effectiveness of interventions influence these attitudes. The researchers developed the Attitudes towards Wild Animal Welfare (AWAW) scale to measure these four key factors.

This research fills an important gap, as previous studies on human-animal relationships have focused primarily on companion animals, farm animals, or conservation issues, rather than attitudes about naturally occurring wild animal suffering. Understanding these attitudes could help inform future research on the topic of wild animal welfare and contribute to wild animal advocacy.

What did the researchers do and find?

The researchers developed and validated the AWAW scale through a series of four studies involving 2,866 participants total. They began by creating a pool of potential questions, testing them in a pretest, and then conducting three exploratory studies to refine the scale. The final confirmatory study validated a 16-item scale with four items for each of the four factors.

The researchers found that:

- The four-factor structure was consistently supported across all studies.
- The scale demonstrated good reliability and validity, with factors showing expected relationships with related measures.
- People who cared more about wild animal welfare also showed more favorable to animals in general and reduced speciesism.
- People who cared more about wild animal welfare were also more supportive of interventions to help wild animals and less likely to believe such interventions would be ineffective.

- Women showed higher levels of caring about wild animal welfare and greater support for interventions compared to men.
- People who reported being omnivores (meat-eaters) showed less concern for wild animal welfare and less support for interventions compared to those following other diets.
- All four factors predicted whether participants would choose to donate to a wild animal charity, demonstrating that these attitudes influence behavior.
- Surprisingly, beliefs that nature is idyllic for wild animals showed only weak correlations with other factors, though the researchers retained this factor due to its theoretical importance.

What do these findings mean?

These findings provide a validated tool for measuring people's attitudes and beliefs about wild animal welfare, which can help advance research in this emerging field. The scale will allow researchers to better understand what drives concern for wild animals and support for interventions to reduce their suffering.

The results suggest that many people do care about wild animal suffering, even when it comes from natural causes, and many support at least some interventions to help wild animals. This challenges the assumption that wild animal welfare is universally neglected. However, support varies significantly depending on the type of intervention, with more support for interventions like providing for basic needs or helping during natural disasters than for more controversial interventions like genetic modification.

The AWAW scale will enable future research on psychological factors that influence wild animal welfare attitudes, cross-cultural differences in these attitudes, and how these attitudes may change over time or in response to advocacy efforts. This research may ultimately inform policies and interventions aimed at reducing the suffering of wild animals in their natural habitats.

Wild animals in their natural environments face numerous threats to their health and well-being. These include dehydration, starvation, physical injuries, intra- and interspecies conflict, diseases, parasites, and psychological stress. Such threats are exacerbated by the reproductive strategies of many species. Unlike humans, who typically have few offspring and invest heavily in their care, many animal species produce large numbers of offspring. For a population to remain stable over time, on average, only two offspring per pair survive to adulthood and reproduce. This means many of these animals die before reaching maturity, often due to competition for limited resources or predation. Moreover, for many prey species, the threat of predation persists throughout their life. The magnitude and sheer number of these hardships have led some scholars to conclude that most wild animals' lives contain more suffering than happiness (Horta, 2015).

Wild Animal Suffering as a Moral Problem

Historically, the suffering of wild animals has been largely overlooked as a moral issue. The prevailing view among ethicists was that we should not intervene in the lives of wild animals. This was justified by arguments that wild animals fall outside our sphere of ethical concern (e.g., Regan, 1983) and that little can be done to mitigate their suffering (e.g., Delon & Purves, 2018). The issue of preventing predation in nature faced particularly strong opposition, with some philosophers using it as a *reductio ad absurdum* argument against extending moral consideration to individual wild animals (Everett, 2001).

However, others argue that wild animals do deserve moral consideration, as seen in recent work (Faria, 2023; Horta, 2015; Soryl et al., 2021; Tomasik, 2009). Advocates for wild animal welfare (WAW) argue that all sentient beings, regardless of their species, deserve moral consideration. They argue that if we must alleviate human and domestic animal suffering, it would be ethically inconsistent to disregard the immense and often brutal suffering experienced by wild animals in natural ecosystems. Crucially, WAW advocates are not only concerned with anthropogenic wild animal suffering (i.e., suffering caused by humans). Rather, they advocate for promoting the welfare of wild animals even when their suffering is entirely due to natural causes.

WAW advocates challenge the notion that it's impossible to intervene in nature and help wild animals. Though not always performed to improve the welfare of wild animals, interventions exist such as feeding programs and using contraceptives to manage population sizes. Animal shelters, too, represent small-scale interventions by providing care and rehabilitation, and some suggest technological advances such as CRISPR, a form of gene editing, could disperse beneficial traits through wild animal populations (Johannsen, 2020).

The Psychology of Human-Wild Animal Relations

While activists and philosophers have increasingly considered WAW, little psychological research exists on this topic (Waldhorn, 2019). Psychologists have extensively studied human-animal relationships, as evidenced by work on companion animals, the application of social psychological theories such as social identity theory and self-categorization theory to human-animal relations, the generalization of prejudice and social dominance to how humans treat and perceive animals, as well as the psychology of eating animals, with a focus on the conflict between the consumption of animal products and the expressed love for animals (for an overview, see Amiot & Bastian, 2015). This research has, however, generally not involved the welfare of wild animals.

One possible exception is work in environmental psychology addressing human-wild animal interactions. Generally referred to as "human dimensions of wildlife" (Jacobs et al., 2013), this work consists of determining wildlife-related value orientations to predict people's attitudes, norms, and behaviors towards wildlife. Two primary wildlife value

orientations have been the focus of this work: domination and mutualism (Jacobs et al., 2013). People with a domination orientation believe that wildlife should be used and managed for human benefit while those with a mutualism orientation see wildlife as part of an extended family, deserving of rights and care. While the latter may seem to address WAW concerns, the focus is predominantly on wildlife management issues such as hunting and recreational viewing of wildlife. It generally fails to consider attitudes towards how non-anthropogenic factors affect the welfare of wild animals.

The neglected status of research on WAW means little is known about people's attitudes towards WAW and related beliefs. Are people generally concerned about the suffering of wild animals, even when their suffering is entirely due to natural causes? Do they support interventions to improve their welfare? And what kind of beliefs may explain these attitudes? Despite the lack of research, some research, albeit indirectly, addresses these questions.

Attitudes Towards Wild Animal Welfare

Caring About Wild Animals

A commonly cited factor for the historical neglect of wild animal suffering is speciesism (Faria, 2023; Horta, 2016). Speciesism refers to a bias favoring members of one's own species and against those of members of other species (Ryder, 2010). Using a new scale designed to measure speciesist attitudes, Caviola et al. (2019) found that speciesism related to less concern for non-wild animals, as well as beliefs that animals have lower intelligence and a reduced capacity for suffering than humans. These results, as well as the work by philosophers of WAW, suggest that speciesist attitudes may relate to a lower concern for wild animals as well.

There may also be other reasons for a lack of compassion for wild animals. One important factor may be the scale of wild animal suffering. Compared to the 8 billion people alive today, there are an estimated 88 billion wild mammals, 100 billion birds, 1000 trillion fish, and orders of magnitude more animals from other phyla such as arthropods and nematodes (Greenspoon et al., 2023). The immense scale of suffering experienced by wild animals likely poses a significant challenge in eliciting widespread concern and compassion. People may display scope insensitivity, a cognitive response that causes individuals to undervalue or overlook large-scale suffering. Similarly, the collapse of compassion, a phenomenon where empathy diminishes as the number of individuals in need increases, further suggests less compassion for the most numerous wild animals.

However, there is also substantial evidence for much interest and concern for wild animals. This is evidenced by, for example, the popularity of wildlife-based tourism and TV documentaries. Furthermore, shifts have been observed from domination to mutualist wildlife value orientations (Jacobs et al., 2022). Yet, despite research showing an increase in wild animal concerns, it is not clear whether this research reveals concerns about wild animals suffering from natural harms.

WAW concerns may also differ between groups. Animal *rights* activists, driven by concerns of animal rights violations, may not see the suffering of wild animals as a violation of their fundamental rights if the suffering has natural causes. In contrast, animal *welfare* activists, who focus more exclusively on the extent to which animals suffer, may be more likely to generalize their concerns to the domain of natural harms to wild animals.

Support for Wild Animal Welfare Interventions

It's not clear how much interventions to alleviate wild animal suffering are supported. While concern for wild animals may influence support for interventions, this does not necessarily follow. Additionally, not only is the scale of wild animals suffering large, most feasible interventions will affect only a small share of all wild animals. This may cause futility thinking—the phenomenon that individuals avoid compassionate action if they perceive their efforts as futile. Finally, practical concerns concerning the efficacy of interventions and their downstream consequences, related to the complexity of ecosystems and the dynamics between different groups of animals (e.g., prey-predator relations), may cause uncertainties about supporting intervening in nature.

Despite these worries, it has been speculated that those with a strong mutualism orientation are more likely to engage in welfare-enhancing behaviors for individual wildlife (e.g., feeding, nurturing abandoned or hurt animals; Teel et al., 2007), yet there is little research to demonstrate this relationship. An exception is a study by Jacobs et al. (2014) in which they assessed support for feeding starving herbivores during winter. A majority (83%) found the intervention acceptable, but the predictive potential of wildlife value orientations was low, suggesting that better measures are needed to assess support for WAW enhancing interventions.

Support for interventions may also differ between groups of people. Driven by their ethical values regarding conservation and non-interference, members from environmentalist groups may actively support non-intervention (see Faria & Paez, 2019), in contrast to the views expressed by WAW advocates.

Beliefs Underlying Wild Animal Welfare Attitudes

Idyllic View of Nature

WAW advocates frequently theorize that an idyllic view of nature is a prevalent belief that explains people's apparent neglect of the suffering of wild animals (e.g., Horta, 2010). The idyllic view of nature represents the view that nature, when free of anthropogenic influence, is a place in which animals coexist harmoniously, leading to wild animals living predominantly happy lives. This view may prevent people from realizing the suffering that wild animals experience, leading to few concerns about their welfare.

It is unclear how prevalent the idyllic view of nature is, although there is some indirect evidence for its existence. When asked to describe nature, people often report

positive aspects of nature such as references to purity, beauty, and peace (Vining & Merrick, 2008). People also appeal to nature as an argument that something is good, or its inverse: arguing that something is bad because it is unnatural, as seen in attitudes towards products such as cultured meat (Siegrist & Sütterlin, 2017).

The idyllic viewpoint may also stem from the availability heuristic. It has been claimed that individuals, when asked to imagine nature, predominantly imagine large-bodied mammals such as gazelles and lions (Horta, 2010; Johannsen, 2020). These species may lead comparatively more pleasant lives, reinforcing the idyllic view. People living in generally favorable conditions may also extrapolate their own experience to other species or believe in this idyllic view due to consistency pressures stemming from other beliefs (e.g., just world beliefs).

Despite WAW proponents frequently citing idyllic beliefs, there is little direct evidence to support that it is both prevalent and that it is associated with a reduced concern for wild animal suffering.

Intervention Ineffectiveness

A common objection to aiding wild animals through intervention stems from concerns about ineffectiveness or potential harm (Delon & Purves, 2018). People may worry about unforeseen negative consequences in ecosystems or that certain interventions, like preventing predation, would necessarily harm predators unless innovative solutions are developed (e.g., genetically altering predators). The perception of intractable solutions may lead to a limited concern for wild animals.

The Attitudes Towards Wild Animal Welfare Scale

As the preceding sections demonstrate, there is a significant gap in our understanding of how people perceive the challenges faced by wild animals in nature. This knowledge gap is particularly important to address given recent scholarly work on WAW as an area of research and ethical concern. We therefore introduce the Attitudes towards Wild Animal Welfare (AWAW) scale. This scale measures caring about WAW, support for interventions to improve WAW, idyllic views of nature, and intervention ineffectiveness beliefs. This scale will enable researchers to address questions currently being raised by scholars and advocates of WAW.

The AWAW scale will not only be of interest to researchers interested in WAW, but also to researchers who study animal attitudes in general. People's attitudes towards WAW are likely to differ substantially from other animal-related attitudes, such as those towards factory farmed animals. Unlike factory farming, where humans directly cause harm, wild animal suffering often involves acts of omission rather than commission, potentially altering moral intuitions and perceived responsibility. The absence of a clear oppressor-victim dynamic in nature may also remove the justice component that often drives concern for farmed animals. Additionally, we do not generally rely on wild ani-

mals for meat consumption, which eliminates a common source of cognitive dissonance present in attitudes towards farm animal welfare. Finally, the perception of nature as inherently good or sacred might introduce a naturalistic bias that does not apply to factory farming. These unique psychological factors underscore the importance of research into WAW.

Our scale may also serve as a tool to understand human psychology more broadly. Psychological research on WAW could inform theories on moralization, as advocates aim to promote ethical obligations towards wild animals. It also presents opportunities to study misinformed views about nature and debiasing strategies, as well as extreme cases of outgroup helping with no reciprocity potential. Finally, the large scale of wild animal suffering allows researchers to examine responses to extensive suffering, such as futility thinking, scope neglect, and the collapse of compassion.

Overview

In this paper we present the scale development process of the AWAW scale. We discuss how we generated a pool of candidate items based on the theoretical framework consisting of measuring attitudes (caring about the welfare of wild animals, supporting interventions) and related beliefs (idyllic views of nature and perceptions of intervention effectiveness). We report on the results of a pretest and three exploratory factor analysis studies that included both exploratory and confirmatory factor analyses to assess the reliability and validity of the items. The results of these studies produced a 16-item scale, with four items per factor. The results were then replicated in a fully confirmatory fourth study, which is the focus of this paper. All studies, excluding the pretest, were preregistered. Materials, scripts, data, and preregistrations of each study are available on OSF (see Sleegers et al., 2024). Ethical approval was obtained via the ethics committee of Maastricht University.

Item Generation

We generated items for four different factors, with the following definitions:

1. Caring about WAW: A concern for wild animal suffering due to natural causes
2. Intervention support: Supporting interventions to augment wild animal welfare and ameliorate suffering due to natural causes
3. Idyllic view of nature: The view that animals' lives in natural settings are generally pleasant and good.
4. Intervention ineffectiveness belief: The belief that interventions to help wild animals are ineffective or do more harm than good.

The initial pool of items to measure these factors consisted predominantly of newly generated items and several individual items from existing scales and surveys conducted by animal welfare organizations (for examples, see Table 1). Items were reviewed by three wild animal welfare experts who highlighted challenges such as ambiguity in the items about which animals were being referenced. Their feedback informed our scale instructions and led to further item refinements. We then generated additional positively and negatively worded items to expand options for initial evaluation.

Table 1

The Wild Animal Welfare Scale

#	Item	Subscale
1	I care about wild animals that are in pain, no matter whether their suffering is due to human or natural causes.	Caring
2	I care about the difficulties wild animals face in their natural environment, even when these are solely due to nature.	Caring
3	When I hear in the news about a natural disaster (e.g., earthquakes, tsunamis), I often think about the fate of wild animals living in that area.	Caring
4	When I watch nature documentaries that show wild animals in pain, it upsets me.	Caring
5	We should intervene in nature to reduce the natural hardships wild animals face.	Intervention
6	Humans should take steps to try and reduce the suffering of wild animals, even when that suffering is entirely due to natural causes.	Intervention
7	Humans should try to protect wild animals from natural threats such as predators and disease.	Intervention
8	We should intervene in nature to help wild animals that are in pain, no matter what causes their suffering.	Intervention
9	In their natural environment, unaffected by humans, wild animals live pleasant lives.	Idyllic view
10	As long as they are not harmed by humans, wild animals mostly live good lives in their natural habitats.	Idyllic view
11	Wild animals generally thrive and live pleasant lives when they're in their natural habitat.	Idyllic view
12	The natural order ensures that wild animals live mostly good lives.	Idyllic view
13	Ecosystems are too complex to predict the outcomes of efforts aimed at improving the lives of wild animals.	Ineffectiveness
14	Nothing much can be done to reduce the hardships that affect animals living in the wild.	Ineffectiveness
15	It is not possible to reliably improve the lives of wild animals.	Ineffectiveness
16	It is not possible to solve the problems that wild animals face in nature.	Ineffectiveness

We conducted an initial review of the items to filter out major redundancies between items, irrelevant items, and poorly worded or confusing items. Following this, we created a shortlist of items to begin pretesting.

Pretest

A pretest was conducted using the Response Process Evaluation method (Wolf et al., 2019) to evaluate participants' understanding of the items and make necessary adjustments. Responses were assessed to determine whether respondents interpreted items as intended, and items were revised or discarded as necessary.

We ran a total of three rounds. Fifty-eight participants participated in the first round, 60 in the second round, and 25 in the third round. Participants were presented with eight items (e.g., "I worry about the hardships that wild animals face.") out of a total of 46, 48, and 20 items, respectively. For each item, they were asked to indicate what they believe the item means, how they would respond, whether the options allowed them to accurately express their attitude, and whether there is something they did not understand or would change. After each round, the responses were evaluated and items were prepared for the next round.

As a result of the pretest, several items were discarded due to little response variation and others were discarded or adjusted to address misunderstandings. Several items appeared to be misunderstood and were either discarded or adjusted. A common misunderstanding was that participants often reported thinking of human-caused sources of suffering when the item was designed to refer to naturally occurring sources of suffering. After the final round, forty items were selected for inclusion in the exploratory factor analysis studies.

Studies 1–3 Summary

We conducted three exploratory studies from April to September 2022 to establish the factor structure of the scale. Across these studies, we employed both exploratory factor analyses (EFA) and confirmatory factor analyses (CFA) to assess whether the data supported our theorized four-factor structure and to identify problematic items for refinement. Below we summarize the approach and results. More details per study can be found in the Supplemental Materials.

Factor Analysis Approach

Our approach consisted of performing both exploratory and confirmatory factor analyses. We conducted EFA to see whether the data supported a 4-factor structure or alternative factor structures. Additionally, we used the EFA results to identify problematic items in order to revise them or discard them. We also relied on CFA to more stringently test whether the items, or a subset of the items, fit our theoretically derived 4-factor structure and provide additional evidence for problematic items. Study 4, in contrast, consisted of a fully confirmatory test of the results from the first three exploratory studies.

Exploratory Factor Analyses

The EFAs were performed in R, using the EFAtools and psych packages. We used multiple factor retention criteria to assess the number of factors (e.g., comparison data, Velicer's MAP, scree plots), consistent with recommendations to base one's decision regarding the number of factors on multiple criteria, including the theoretical framework (Osborne, 2014).

Next, we performed EFAs with the principal axis factoring method, oblimin rotation, and bootstrapped confidence intervals. The principal axis factor method was chosen because it is more robust to violations of normality. We chose oblimin rotation because factors were likely correlated.

We then interpreted the factor structure by inspecting the factor loadings and whether the items load onto factors that coincide with our expected factor structure[1] in order to identify problematic items. Note that we did not solely rely on fixed criteria but also took into account tradeoffs between the factor loadings, cross loadings, and theoretical interpretability.

Confirmatory Factor Analyses

We followed up on the EFA with a CFA to test the model fit of a simple structure model. That is, we assessed the fit of a model with the items loading only on their supposed factor.

Model fit was assessed using dynamic cut-off indices for the SRMR, RMSEA, and CFI fit indices. A common approach among researchers is to rely on fixed cutoffs derived by Hu and Bentler (1999). However, methodologists have cautioned against this because the appropriate cut-off point for a fit index varies based on model characteristics like factor reliability, number of items, and number of factors. We therefore relied on dynamic fit index cutoffs tailored to the specific model and data characteristics being evaluated (McNeish & Wolf, 2023). This method produces cutoffs for the fit measures at multiple levels of misspecification. We considered a model to have good fit if they passed the most stringent level of misspecification (Level 1).

For model fit failures, we used Model-Implied Instrumental Variable (MIIV) estimation to identify problematic items and remove them. We chose MIIV because it does not require convergence or normality assumptions, provides diagnostic tests for individual equations (preventing error spread unlike maximum likelihood), and allows theory-driven item selection by using reference items. Cross loadings or correlated residuals were not included to maintain a simple factor structure.

In-between studies we made item adjustments and created new items. For example, we replaced several intervention items about helping wild animals with more specific

1) We preregistered that we considered a factor loading of .3 as significant, but this was not used as a strict rule to retain items during the item removal phase for the confirmatory factor analyses.

items about not interfering in nature to reduce cross loadings with the caring factor. We added more idyllic items about animals living positive lives in the wild because of a possible method effect due to having mostly negatively-worded items and we also expanded items for the ineffectiveness items, which consisted mostly of items referring to possible backfire effects of helping wild animals, to also include items about a general inability to help wild animals.

Results

Across all three studies (total N = 2,102), preliminary analyses indicated excellent suitability for factor analysis, with Kaiser-Meyer-Olkin measures exceeding .94 and significant Bartlett's tests of sphericity. Mardia's tests of multivariate skew and kurtosis indicated violations from normality in all three studies.

Multiple factor retention criteria supported a four-factor structure. The empirical Kaiser method, Kaiser-Guttman with EFA, and lower bound of RMSEA consistently suggested four factors, with other methods suggesting more factors. Scree plots indicated either a four- or five-factor structure, though additional analyses revealed the fifth factor represented a method effect distinguishing positively and negatively worded idyllic items rather than a substantive factor.

The four-factor EFA solution explained 48–50% of the variance across the three studies. The caring factor explained 14–17% of variance (eigenvalues = 5.58–7.79), the intervention factor 13–14% (eigenvalues = 5.36–6.22), the idyllic factor 11–12% (eigenvalues = 4.33–5.26), and the ineffectiveness factor 8–11% (eigenvalues = 3.13–4.35). While factor loadings generally aligned with our theoretical structure, several items exhibited weak loadings (< .30) or cross-loadings, particularly in Study 1.

Initial CFAs with all items included in the models produced unacceptable fit across studies. Through iterative item removals guided by the EFA results, modification indices, and MIIV diagnostics, we achieved acceptable fit in Studies 2 and 3. Study 2's reduced model (4–5 items per factor) met dynamic fit criteria (SRMR = .037 < .057, RMSEA = .036 < .048, CFI = .98 > .96). Study 3's reduced model with four items per factor also met the dynamic fit criteria (SRMR = .034 < .066, RMSEA = .036 < .061, CFI = .98 > .94) and showed acceptable to good reliabilities (caring: ω = .80, α = .80; intervention: ω = .82, α = .83; idyllic: ω = .85, α = .85; ineffectiveness: ω = .78, α = .78).

Study 3 also provided preliminary evidence of construct validity. The factors demonstrated theoretically consistent correlations: caring correlated positively with intervention attitudes (r = .49) and negatively with ineffectiveness beliefs (r = -.32); intervention attitudes correlated negatively with ineffectiveness beliefs (r = -.50). Surprisingly, idyllic beliefs showed minimal correlations with other factors. Both caring and intervention attitudes correlated negatively with a measure of speciesism and positively with support for specific interventions aimed at helping wild animals (e.g., providing for basic needs or help during natural disasters). Finally, women showed higher scores on the caring,

intervention, and idyllic factors; and participants who reported being omnivores scored lower on caring and intervention, but higher on the idyllic and ineffectiveness factor.

Discussion

The exploratory factor analyses generally supported a 4-factor structure consistent with our theoretical background. The more stringent confirmatory factor analyses, however, showed that the data did not fit with simple structure models including all items and that item removals were necessary. No well-fitting model could be obtained in Study 1, but the refinements made between studies proved successful in Study 2, where a reduced model with 4-5 items per factor could be obtained. The results of Study 3 also supported a 4-factor model with 4 items on each factor. Importantly, these items were also included in the reduced confirmatory factor model of Study 2, replicating the factor structure. The factors, except for the idyllic factor, also showed theoretically consistent patterns with other measures, including speciesism and support for specific wild animal interventions, sex, and diet–resulting in a 16-item scale (Table 1).

Study 4

The main goal of Study 4 was to replicate the confirmatory factor analysis results from Study 3, which would provide further support for the 16-item scale. The second goal was to further validate the scale by assessing its correlations with related constructs and a behavioral outcome.

Hypotheses

We hypothesized that caring about WAW should be negatively related to speciesism and positively related to animal attitudes, the intervention factor, supporting interventions in nature[2], and donating to a wild animal charity. Additionally, we hypothesized that women care more about wild animals while omnivores care less, consistent with findings involving general animal attitudes and the results from Study 3. Intervention attitudes should be positively related to supporting wild animal interventions and donating to the wild animal charity. In contrast, ineffectiveness beliefs should be negatively related to the intervention factor, supporting wild animal interventions, and donating to the wild animal charity. Finally, while we expected idyllic beliefs would be negatively related to supporting interventions, in previous studies we did not observe this relationship. Instead, we sought to validate this factor by measuring its relationship with a measure

2) In the previous study we found that the caring factor was positively correlated with the majority of the support items, but not all.

of optimistic attitudes. A general propensity to be optimistic may also extend to positive views of nature and wild animal lives; we therefore could expect a positive relationship.

Method

Procedure and Materials

Participants completed a survey in Qualtrics (Qualtrics, Provo, UT). They started by giving their consent, followed by the scale items, an attention check item, and several additional measures.

Attitudes Towards Wild Animal Welfare Scale

The AWAW scale consisted of 16 items based on the results of Study 3. Prior to responding to the items, participants were given a definition of a wild animal[3] and were instructed to indicate to what extent they agree or disagree with each of the statements (i.e., the scale items). We explicitly noted that some statements may be difficult to respond to and that they should try to summarize their view and pick the response that best reflects their attitude. The response format consisted of a 7-point fully labeled Likert scale ranging from "Strongly disagree" to "Strongly agree". Items were presented one by one in a random order.

Attention Check

Immediately following the scale items, participants received an attention check item that directed participants to select a specific response option.

Additional Measures

Additional measures consisted of the speciesism scale (Caviola et al., 2019; 6 items; ω = .68, α = .78), the BFI-2-XS personality scale (Soto & John, 2017)[4], the Animal Attitude Scale (Herzog et al., 1991; 5 items; ω = .52, α = .67) and the Optimism-Pessimism Short Scale-2 (Nießen et al., 2022; 2 items; α = .88)[5], and individual items to assess attitudes towards specific wild animal interventions. In addition to these measures, we also included a donation task. Participants were given a bonus of £0.25 and could either keep this bonus or donate it to one of three charities: a wild animal charity (Wild Animal Initiative), a farmed animal-focused charity (The Humane League), and a human-focused

3) The definition reads "A wild animal is any animal that is not a domesticated, farmed, or captive animal. Wild animals include many different kinds of animals, including mammals, insects, fishes, birds, and more."

4) 15 items, with 3 items per personality trait: openness (α = .63), conscientiousness (α = .70), extraversion (α = .62), agreeableness (α = .59), and neuroticism (α = .78).

5) We included the Oxford Utilitarianism Scale for exploratory purposes and dropped the New Ecological Paradigm scale due to poor psychometric properties in Study 3.

charity (Malaria Consortium). This allowed us to test whether wild animal attitudes can uniquely predict donating to a wild animal charity, above and beyond donating to a farmed animal-focused charity and human-focused charity. Each charity was presented, in random order, with their logo, a link to their website, and a brief description of their mission: Wild Animal Initiative ("to understand and improve the lives of wild animals"), the Humane League ("to end the abuse of animals raised for food"), and the Malaria Consortium ("to save lives and improve the health of people in Africa and Asia").

Demographics included sex, age, diet, and political orientation, as well as additional control variables consisting of the participants' education level, income, ethnicity, and religion.

Sample Size

A total of 847 participants were recruited for this study. This sample size was deemed sufficient as it enabled us to obtain Level-1 cut-offs for the dynamic fit indices based on results from the previous studies.

Sample

The sample consisted of UK respondents who did not participate in the pretest or previous studies. Most respondents were female (61.81%), followed by males (37.35%) and non-binary respondents (0.60%). Two respondents preferred not to answer this question (0.24%). Respondents' average age was 38.78 (*SD* = 13.16). The study was performed in March, 2023.

Exclusion Criteria

The exclusion criteria consisted of failing an attention check and straightlining on all scale items. No straightlining was found. A total of 17 participants failed the attention check, resulting in a final sample size of 830 participants.

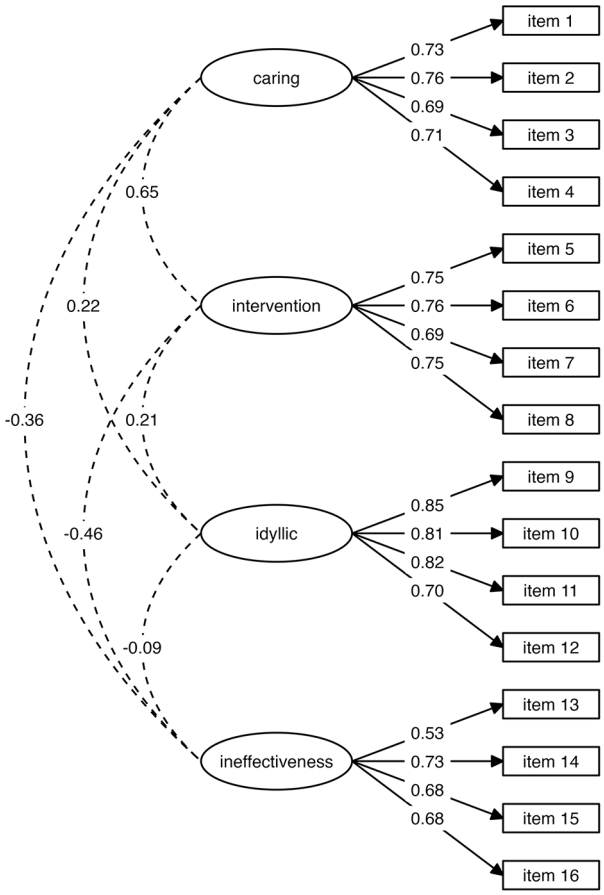
Results

Confirmatory Factor Analysis

A model consisting of four factors, with 4 items loading on each factor, produced a model with good fit, $\chi^2(98) = 209.95$, $p < .001$, SRMR = .033 < .066, RMSEA = .037 < .053 (90% CI [.030, .044]), CFI = .98 > .96, replicating the CFA from Study 3. Factor loadings were high, ranging from .53 to .85, see Figure 1. The factor reliabilities were acceptable to good (caring: $\omega = .80$, $\alpha = .80$; intervention: $\omega = .82$, $\alpha = .82$; idyllic: $\omega = .87$, $\alpha = .87$; ineffectiveness: $\omega = .75$, $\alpha = .75$).

Figure 1

Confirmatory Factor Analysis Model of Study 4, Including Factor Loadings



Construct Validity

The correlations between the scale factors indicated a positive relationship between caring and intervention attitudes, as well as a negative relationship of both factors with ineffectiveness beliefs (Table 2). This time there was also a significant positive (albeit small) correlation with idyllic views, even when controlling for the control measures. Both caring and intervention attitudes were again negatively correlated with speciesism. As expected, the opposite pattern was found with the Animal Attitudes Scale. No significant correlations were found between the factors and optimism.

Table 2

Correlations Between Four Factors, Other Measures, and WAW Interventions in Study 4

Variable	*M*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
AWAW factors															
1. Caring	5.38	—	.53**	.19**	-.29**	-.59**	.60**	.01	.50**	.46**	.49**	.45**	.01	-.02	.27**
2. Intervention	4.32	.45**	—	.18**	-.35**	-.29**	.30**	-.04	.46**	.51**	.34**	.47**	.27**	.15**	.46**
3. Idyllic view	5.05	.13**	.14**	—	-.06	-.15**	.10**	.09*	.14**	.08*	.10**	.20**	-.07	-.10**	.10**
4. Ineffectiveness	3.72	-.25**	-.33**	-.05	—	.22**	-.20**	-.01	-.22**	-.25**	-.23**	-.28**	-.18**	-.10**	-.30**
Other measures															
5. Speciesism	2.43	-.51**	-.23**	-.13**	.21**	—	-.73**	.06	-.37**	-.30**	-.37**	-.32**	.13**	.11**	-.13**
6. AAS	3.94	.52**	.25**	.06	-.19**	-.69**	—	-.04	.35**	.32**	.31**	.33**	-.05	-.06	.15**
7. Optimism	4.34	-.01	-.06	.05	-.02	.08	-.07	—	-.03	-.07*	-.04	-.01	-.07*	-.07	-.03
WAW interventions															
8. Monitor and rescue	6.00	.43**	.42**	.11**	-.21**	-.32**	.30**	-.02	—	.62**	.54**	.52**	.10**	.12**	.32**
9. Vaccinate and heal	5.65	.40**	.48**	.04	-.24**	-.24**	.27**	-.04	.61**	—	.47**	.51**	.24**	.15**	.37**
10. Help in natural disasters	6.39	.43**	.30**	.06	-.21**	-.32**	.25**	-.04	.52**	.44**	—	.44**	-.02	.05	.23**
11. Provide for basic needs	5.55	.38**	.44**	.17**	-.27**	-.26**	.27**	.01	.50**	.49**	.41**	—	.17**	.12**	.37**
12. Genetic manipulation	2.64	.06	.31**	-.06	-.20**	.11**	-.02	-.01	.12**	.26**	-.01	.19**	—	.34**	.38**
13. Control fertility	4.02	.00	.16**	-.09**	-.11**	.10**	-.05	-.04	.13**	.16**	.06	.13**	.33**	—	.27**
14. Conduct research	4.51	.23**	.44**	.08*	-.29**	-.10**	.11**	-.01	.31**	.35**	.20**	.34**	.38**	.28**	—

Note. Numbers below the diagonal are correlations controlled for the control variables.

*$p < .05$. **$p < .01$.

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Caring was again significantly and positively correlated with supporting various interventions, except for an intervention aimed at controlling the fertility of wild animals. The intervention factor was significantly and positively correlated to all interventions, replicating the findings from Study 3.

Finally, we found that women showed higher scores on caring and intervention attitudes, as well as idyllic views, but lower on ineffectiveness beliefs (Table 3). Additionally, participants who reported being omnivores scored lower on caring and intervention attitudes, but higher on ineffectiveness beliefs. No significant difference was found regarding idyllic views.

Table 3

t-Test Results of the Effects of Sex and Diet on Each Factor

Comparison	Factor	*t*	*df*	*p*	d	95% CI
Female vs. non-female	Caring	8.62	609.52	< .001	0.63	[0.49, 0.78]
	Intervention	6.37	655.50	< .001	0.46	[0.32, 0.60]
	Idyllic	3.22	638.61	.0013	0.23	[0.09, 0.37]
	Ineffectiveness	-2.23	685.75	.026	-0.16	[-0.30, -0.02]
Omnivore vs. non-omnivore	Caring	-8.35	805.25	< .001	-0.57	[-0.72, -0.43]
	Intervention	-3.36	762.91	< .001	-0.24	[-0.37, -0.10]
	Idyllic	0.24	728.95	.81	0.02	[-0.12, 0.16]
	Ineffectiveness	3.68	758.42	< .001	0.26	[0.12, 0.40]

Donation Task

For each factor, we conducted a multinomial regression in which the donation choice was regressed on the mean score of the factor. We then ran additional regressions to also include control variables. The results are presented in Figure 2 and Table 4, which contains the test statistics for the slope of the factor (i.e., whether the factor could predict donating to the wild animal charity) and the difference in slopes of the factor between donating to the wild animal charity and the factory farming animal charity (i.e., whether the factor could predict donating to the wild animal charity more so than it predicts donating to the animal charity). All factors significantly predicted donating to the wild animal charity, with a positive relationship for all factors except intervention ineffectiveness. Additionally, contrasts between the two animal charities were significant for all factors except for the intervention ineffectiveness factor.

Figure 2

Predicted Probabilities From the Multinomial Regression Models Predicting Donation Behavior Based on the Four Scale Factors

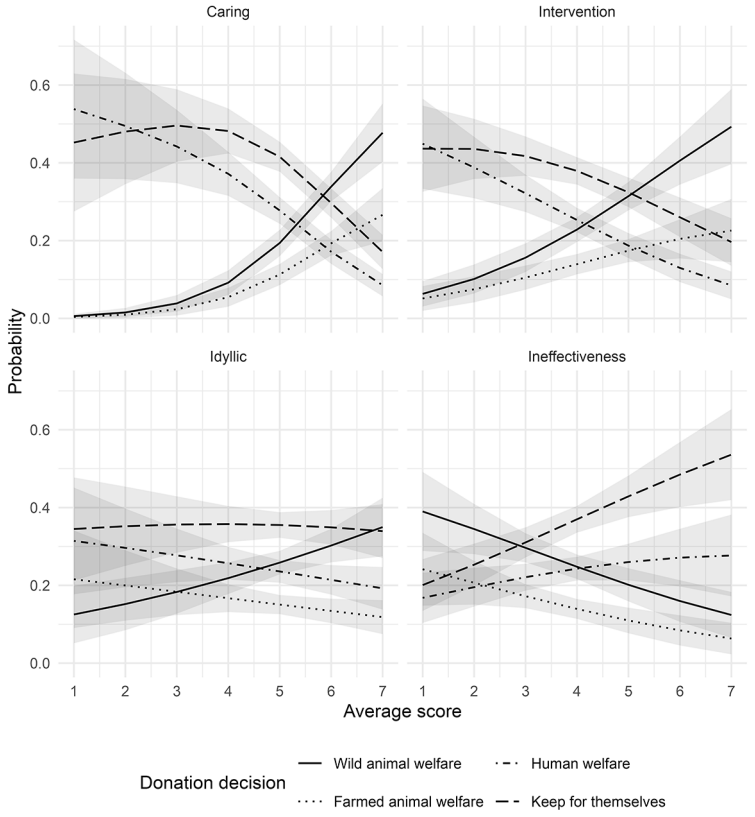

Table 4

Regression Coefficients of Each Multinomial Regression Model Predicting Donating to the Wild Animal Charity

Test	Predictors	*b*	95% CI	*SE*	*z*	*p*
Slope	Caring	0.12	[0.094, 0.15]	0.015	8.08	< .001
	+ controls	0.14	[0.11, 0.17]	0.017	8.42	< .001
Contrast	Caring	0.056	[0.0059, 0.11]	0.026	2.19	.029
	+ controls	0.086	[0.034, 0.14]	0.027	3.22	.0013
Slope	Intervention	0.079	[0.055, 0.10]	0.012	6.40	< .001
	+ controls	0.080	[0.054, 0.11]	0.013	6.08	< .001
Contrast	Intervention	0.047	[0.010, 0.084]	0.019	2.50	.013
	+ controls	0.055	[0.017, 0.094]	0.020	2.81	.0050

Test	Predictors	*b*	95% CI	*SE*	*z*	*p*
Slope	Idyllic view	0.042	[0.012, 0.072]	0.015	2.75	.0059
	+ controls	0.039	[0.0081, 0.071]	0.016	2.47	.014
Contrast	Idyllic view	0.058	[0.016, 0.10]	0.021	2.73	.0064
	+ controls	0.053	[0.0090, 0.098]	0.023	2.36	.018
Slope	Ineffectiveness	-0.047	[-0.075, -0.019]	0.014	-3.30	< .001
	+ controls	-0.046	[-0.074, -0.017]	0.014	-3.17	.0015
Contrast	Ineffectiveness	-0.016	[-0.057, 0.026]	0.021	-0.73	.46
	+ controls	-0.025	[-0.066, 0.017]	0.021	-1.17	.24

Note. The slope test refers to testing the slope of the scale factor and the contrast refers to the difference in slopes predicting the wild animal charity choice and factory farm animal choice. The controls consisted of age, sex, education, income, ethnicity, religion, politics, Big Five scores, and acquiescent responding.

Additional Analyses

We also conducted several additional analyses to assess metric and scalar invariance across sex and diet. These results are available in the Supplemental Materials. In short, we found only minor differences in fit indices for both sex and diet, though there is a significant chi-squared test for sex, suggesting a violation of scalar invariance.

Discussion

The confirmatory study successfully replicated the findings from Study 3. A model with four items per factor produced a model that passed the model fit criteria. The reliability of each factor was also acceptable to good. Furthermore, the construct validity of the factors was also shown to be largely successful with most pre-registered hypotheses confirmed. The main exceptions were relationships between the idyllic view factor and other measures, which consisted of small effect sizes. The factors predicted donating to a wild animal charity, demonstrating predictive validity; and all factors, except intervention ineffectiveness, were incrementally predictive in predicting a donation to a wild animal charity over a farmed animal charity. Overall, we see the results of this confirmatory study as validating the scale.

General Discussion

Wild animals face numerous challenges and hardships. These struggles are often overlooked or romanticized in popular narratives. Philosophers, researchers, and activists now increasingly call for efforts to better understand and address the natural hardships that wild animals endure. In this paper, we introduced the Attitudes towards Wild Animal Welfare (AWAW) scale to provide a tool for researchers to assess attitudes and beliefs related to the welfare of wild animals. The attitudes consisted of caring about

WAW and supporting interventions to help wild animals. The beliefs consisted of idyllic views of nature and the ineffectiveness of interventions.

Exploratory factor analyses confirmed the 4-factor structure in all three exploratory studies. Multiple factor-retention criteria suggested a four-factor structure. A five-factor structure was also suggested, although this appeared to stem from normal-worded and reverse-worded items of the idyllic factor loading on separate factors. In each study, we performed confirmatory factor analyses to determine the model fit of a simple-structure four factor model and relied on strict dynamic model fit criteria tailored to our model and data (McNeish & Wolf, 2023). This resulted in the removal of a relatively large number of items, producing a scale with four items on each factor. The item selection was confirmed in a confirmatory study, which replicated passing the strict model fit, and reliability, criteria that we maintained.

We found evidence supporting the construct and predictive validity of the scale. Specifically, caring about WAW was found to be positively related to general animal attitudes and negatively related to an assessment of speciesism. Caring was also positively related to supporting interventions in nature, as found in significant correlations with the intervention factor and most of the specific wild animal interventions. Both caring and intervention attitudes were also negatively correlated with intervention ineffectiveness beliefs. Consistent with the literature on sex differences and animal attitudes (Herzog et al., 1991), we found that women showed more caring about wild animal welfare and supported intervening to a larger extent. We additionally found that omnivores cared less about wild animal welfare and were less inclined to support intervening in nature to help wild animals. Finally, all factors predicted donating to a wild animal charity. Caring, intervention attitudes, and idyllic beliefs positively predicted donation behavior to a wild animal charity and to a wild animal charity over a farmed animal charity. Intervention ineffectiveness beliefs negatively predicted donating to a wild animal charity, although it did not significantly differentiate between the wild animal and farmed animal charity.

A notable exception to the overall pattern of supporting results regarding the validity of the scale were the findings related to the idyllic view of nature factor. Correlations between the idyllic view factor and other factors were small and generally not in the expected direction. Idyllic views of nature have often been cited as an explanation for why animal welfare issues are neglected. This suggests that idyllic views should be negatively related to a concern for wild animals and intervention attitudes, yet we observed small but positive correlations. This could mean that idyllic views are not responsible for reduced wild animal concerns. Though philosophers have advanced the potential role of an idyllic view of nature, it's not clear there are psychological reasons to expect this relationship. Thinking that wild animals are well off in nature does not necessarily mean that one should care less about their welfare. One might even care more about their welfare if one believes their lives are generally good, perhaps because instances of

suffering stand out more or because interventions to alleviate suffering are perceived as more tractable if instances of suffering are rare, as implied by an idyllic view.

Alternatively, we may not have successfully captured an idyllic view of nature with our scale. We included a measure of optimism to partially validate the idyllic factor but no strong and robust positive relationships were observed. Admittedly, we did not necessarily expect there to be a strong relationship between a general optimism trait and a specific niche domain such as the idyllic view of nature. We included the optimism measure because, to our knowledge, few other plausible validation measures exist.

Our results indicate that respondents seem to care about the suffering of wild animals, even when it is specified that their sources of suffering are entirely due to natural causes (Table 2). We also found that many respondents support interventions in nature, such as providing for the basic needs of wild animals, treating sick animals, and helping wild animals in fires and natural disasters. This relatively high support for wild animal interventions may be surprising given the narrative that wild animal welfare is a neglected cause area (Johannsen, 2020, p. 5). A possible explanation for this apparent contradiction is that wild animal welfare discussions can quickly move to a discussion of the more challenging aspects of addressing wild animal suffering, such as changing predator-prey relations or considering unusual interventions such as genetic modification of wild animals (Johannsen, 2020). In our results we found less support for genetically modifying wild animals, so attitudes towards addressing wild animal welfare may therefore strongly hinge on the specific issues and interventions under consideration.

Limitations

Several limitations should be acknowledged in our studies. First, we did not assess the stability of the attitudes and beliefs by testing the test-retest reliability of each factor. Responses by some respondents indicated that they had not yet thought about wild animal welfare issues before. This suggests individual attitudes may change over time as respondents more deeply consider these complex issues. Second, our exclusive reliance on respondents from the United Kingdom recruited through Prolific may limit the generalizability of our findings to a broader global population. Cultural and regional differences have been found in wildlife-value orientations (Jacobs et al., 2022). We did find that correlations between the four factors and other measures were generally robust to our control variables, which included income and education. Nevertheless, replicating the factor structure across cultures seems warranted. Furthermore, our study is largely based on self-report measures, which are susceptible to response biases. This could mainly be a concern for the caring factor as displaying a concern for wild animals might be socially desirable. We aimed to mitigate these concerns by using personality traits as a proxy for socially desirable responding and including these as controls in our analyses. Our findings were generally robust to including the control variables, indicating that

socially desirable responding may not account for the patterns we observed. In our final study we also included a behavioral measure of concern for wild animals—a donation to a wild animal charity—and found that caring, as well as the other factors, predicted donating to this cause, further reducing social desirability concerns about these factors.

Despite our efforts to identify remedy sources of misspecification, our final model still showed statistically significant evidence of misspecification (i.e., significant chi-square tests). Our dynamic model fit indices provide some hope that the remaining misspecifications are of minor theoretical importance, but we readily acknowledge that the magnitude of model misfit does not always match the theoretical importance of the misspecifications of the model (Hayduk, 2014). Nevertheless, our inability to notice any additional theoretically relevant factors that could explain unmodeled item covariances gives us confidence that our basic four-factor structure is correct. We therefore consider it more likely that the misfit we identified reflects our preference for a simpler model that does not attempt to figure out which cross-loadings and residual correlations are substantive, versus sample- or population-specific.

Future Directions

The studies reported here provide promising evidence for the reliability and validity of the AWAW scale. However, additional research on its psychometric properties is needed. For instance, we found no evidence of measurement invariance between participants with omnivore vs. non-omnivore diets, and some evidence for scalar non-invariance between male and female participants, though only on the chi-squared test. Future research should test measurement invariance across different groups and assess test-retest reliability to evaluate the stability of attitudes over time. Additionally, testing discriminant validity through other methods—such as a multi-trait, multi-method matrix (Eid et al., 2003)—would help strengthen the scale.

Future research could also use the scale to improve our understanding of human-wild animal relationships. This topic is a rich area of research that can improve our understanding of wild animal attitudes, such as how these attitudes are distributed in populations, across cultures, and how they may change over time.

An area of future research is to further investigate the relationship between WAW and environmental psychology. The study of human-wild animal relationships has historically taken place in the field of environmental psychology, with a focus on people's attitudes related to wildlife management issues such as species conservation and human-animal conflict situations. The environmentalist perspective on wild animal welfare conflicts with the perspective that treats wild animals as individuals and whose suffering is morally problematic regardless of other circumstances (Faria & Paez, 2019). In Study 3 we included the New Ecological Paradigm scale to assess environmentalist attitudes and show that these attitudes are related to caring and intervention views. We observed that the NEP was positively correlated with caring about wild animals but negatively with

intervention. This supports a common view that concern for wild animals is prevalent among environmentalists, but that intervention in nature to alleviate the suffering of wild animals is not supported, perhaps because it would constitute interference in a natural state. We omitted the NEP scale in our confirmatory study due to concerns about its measurement properties, but future research could employ better measures to further understand the relationship between environmentalist attitudes and WAW attitudes, especially considering the diverging views regarding interventions that our data seems to suggest.

Finally, participants may have varying conceptions of 'wildness' given that most ecosystems today are influenced by human activities. Future research could explore whether attitudes differ based on perceived levels of human influence in different environments.

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Ethics Statement: Ethical approval was obtained via the ethics committee of Maastricht University.

Data Availability: For this article, data is freely available (see Sleegers et al., 2024).

Supplementary Materials

All studies, excluding the pretest, were preregistered. Materials, scripts, data, and preregistrations of each study are available on OSF (see Sleegers et al., 2024).

Index of Supplementary Materials

Sleegers, W. W. A., Moss, D., & Reinstein, D. (2025). *Wild Animal Welfare Scale* [Materials, scripts, data, preregistrations]. OSF. https://osf.io/hktzj

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