

The Effect of Value-Targeted Framing in Wildlife Education on Conservation Behavior

Intentions

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Abstract

Wildlife education raises awareness of what actions can be taken for conservation. However, people's willingness to adopt such behaviors is largely predicted by what they value in life. Endorsing strong biospheric values promotes conservation behaviors, but as these behaviors often do not bring personal pleasure, hedonic values tend to inhibit them. In the present study, participants (N = 576) viewed a video about tigers, the most popular wildlife species in Western countries. Videos were either accompanied by educational facts that framed tigers as fun, facts that focused on conservation issues, or no facts. Framing a well-liked species as fun, therefore highlighting the animal as a source of enjoyment, aimed to appeal to participants who prioritize hedonic values. We found that participants who prioritized hedonic values reported significantly lower conservation behavior intentions than participants who prioritized biospheric values, regardless of framing. Our results demonstrate that values may be too abstract to target through framing. Therefore, the present study suggests that interventions to promote conservation behaviors should target more changeable concepts, such as emotional connection to wildlife or felt environmental responsibility.

Keywords: conservation, framing, education, values, wildlife, videos

The effect of value-targeted framing in wildlife education on conservation behavior intentions

There is a near-total scientific consensus that human activities, such as the burning of fossil fuels and deforestation, are the main cause of contemporary climate change and threaten irreversible damage to ecosystems (IPCC, 2022). Over the last fifty years, vertebrate populations have declined by an average of 68% due to alteration or destruction of their habitat (WWF, 2020). To protect life on our planet, humanity must shift from threatening biodiversity to conserving it. Among numerous environmental organizations that have set the conservation of wildlife as their goal, zoos play an especially prominent role. Not only do they contribute directly, for instance through breeding and recovery programs for endangered species (Tribe & Booth, 2003), but they also educate visitors on the threats animals and their habitats face in current times. By raising awareness of conservation issues, many zoos hope to encourage visitors to adopt conservation behaviors. Such behaviors, like making more sustainable food choices or using public transportation, have a positive impact on ecosystems and the availability of environmental resources (Stern, 2000). Indeed, zoo visitors who interact with educational campaigns during their stay, such as informative films, gain a higher understanding of biodiversity and actions they can take to conserve it (Moss et al., 2017).

However, knowledge does not suffice if it does not inspire action. While past research shows a positive relationship between conservation knowledge and willingness to adopt conservation behaviors (Lundberg et al., 2019; Hofman & Hughes, 2018), it is not a reliable predictor in itself (see Skibins & Powell, 2013; Adelman et al., 2010). Whether education inspires a change in behavior seems to depend on the personal characteristics of those being educated (Miller et al., 2018), such as their values (Steg et al., 2012) or emotional connection to wildlife (Skibins & Powell, 2013). Moreover, it has been suggested that behavior is guided by which aspects of a given situation are most salient, or cognitively accessible, to a person

(de Groot & Steg, 2009). The present study aims to expand on this line of research. It explores the potential of *value-targeted framing* in wildlife education: An attempt to make certain aspects of conservation salient so that it appears as something that aligns with people's values. If successful, value-targeted framing could help organizations like zoos to design educational campaigns that inspire action among a broader group of people, even those who are thought to be less likely to adopt conservation behaviors. The following section provides a more detailed explanation.

Value-Targeted Framing

Past research has recognized values as stable predictors of conservation behavior (de Groot & Steg, 2009; Steg et al., 2012). As guiding principles in life (Schwartz, 1992), values define people's beliefs, attitudes, and intentions in a given context. They can also be understood as broad, overarching goals. When deciding whether or not to do something, people take into consideration whether it will contribute to that goal. For instance, some people seek to protect the environment (*biospheric* values), while others find it more important to feel good and reduce the effort for themselves (*hedonic* values). Every person holds these values and others to some extent, but in a situation in which they are in conflict, people are influenced by whichever value has the highest priority to them personally (Steg et al., 2012). Therefore, education advocating for behaviors that improve the environment, but are unpleasant, is more likely to be endorsed by individuals who prioritize biospheric (rather than hedonic) values. In the following, we will refer to the value an individual prioritizes in a given situation as their *value orientation*.

Unfortunately, conservation behaviors often do entail personal concessions. Car use (Green, 2018), meat consumption (Bonnet et al., 2020), and hot showers (Bailey et al., 2014) are just some examples of unsustainable, but for many people enjoyable or convenient behaviors. Consequently, people with a hedonic value orientation are often less likely to adopt

conservation behaviors than those with a biospheric value orientation (Steg et al., 2012). However, hedonic values can also be a basis for conservation behaviors – given that the behavior is perceived as enjoyable (de Groot & Steg, 2009). As an example, picture someone with a hedonic value orientation choosing between riding a bike or driving a car. Their decision depends on what is salient to them: If they focus on the fact that biking takes more effort, they may choose the car as the more comfortable option. In contrast, they could focus on the fact that biking is fun and healthy (Oja et al., 2011), and therefore decide that it contributes more to the goal of feeling good. Notably, having a hedonic value orientation does not necessarily mean choosing the unsustainable option – it means that the sustainability of the behavior is not the factor driving one’s decision. Therefore, it may be possible to inspire people with a hedonic value orientation to adopt conservation behaviors, by communicating that doing so will make them feel good.

However, it may be difficult to directly portray some conservation behaviors as enjoyable. Like biking, some conservation behaviors happen to be inherently fun to some people. But many of the behaviors that are more directly relevant to biodiversity conservation, such as consuming less or donating to environmental causes, are not. Using value-targeted framing, this study attempts to inspire people with a hedonic value orientation to adopt behaviors they would normally find unpleasant. It aims to do so by focusing people’s attention on how animals make them feel, rather than how conservation behaviors make them feel. People are naturally drawn to animals (Barash, 2014). Interacting and learning about them creates positive emotional experiences (Godinez & Fernandez, 2019; Miller et al., 2020), and the main reason people visit zoos is for fun (Klenosky & Saunders, 2007). Given that animals are a source of enjoyment to many people, we propose that a fun learning experience about wildlife, paired with the reminder that it is within one’s power to protect this source of enjoyment, may motivate people with a hedonic value orientation to engage in pro-

conservation behaviors. Rather than focusing on the fact that conservation behaviors may be uncomfortable, we aim to make salient that because people like animals, they would feel good about helping them.

Predictions

The present research aims to answer the following question: How effectively can value-targeted framing in wildlife education increase conservation behavior intentions for individuals with a hedonic value orientation? We propose the following hypotheses: I: That participants with a hedonic value orientation who view a fun-framing educational video will indicate higher intentions to engage in conservation behaviors, compared to those with a hedonic orientation in the conservation-framing condition or control group. II: That across conditions, participants with a biospheric value orientation will be more willing to engage in conservation behaviors than participants with a hedonic value orientation.

Method

Participants

A convenience sample of 576 participants was recruited by 9 undergraduate students of Psychology at the University of Groningen as part of a larger BSc thesis project. Out of all complete responses, 191 participants failed the attention check and 97 failed the manipulation check. Four were underage; one participant was excluded for indicating an invalid age (600 years), and 151 participants gave incomplete responses. Most participants who met one of the exclusion criteria also met other criteria, leaving a total of 301 valid responses for data analysis. 114 participants identified as male, 181 as female, and 6 as non-binary; their ages ranged from 18 to 83 ($M = 37.9$; $SD = 15.917$). 124 participants were German, 74 were Dutch, and 103 were from other countries (for a complete list of participants' nationalities, see appendix A). Participants accessed the study online. No physical or mental impairments that

could potentially interfere with their ability to participate were known. Participation was voluntary and no compensation was given.

Design

The present study utilized a between-group quasi-experimental design. Participants were randomly allocated across three conditions: A conservation-framing condition, a fun-framing condition, and a control condition. There were two independent variables: The framing condition, as well as participants' value orientation. The dependent variable was participants' intention to adopt conservation behaviors. Due to the aforementioned exclusion of invalid survey responses, the remaining group sizes were unequal with a range from $N = 41$ to 60; see table 1.

Materials

All participants viewed an identical video clip of Amur tigers (*Panthera Tigris Altaica*) playing in a zoo enclosure. Depending on the framing condition, videos were accompanied by different educational facts. Facts in the conservation-framing group highlighted conservation issues, for example, 'In order to conserve the habitat of one tiger, approximately 10 000 hectares of forest have to be protected.' Facts in the fun-framing group were chosen to be entertaining and novel to participants, for example, 'A tiger's roar can be heard about 3 kilometers away.' A complete list of facts per condition can be found in appendix B. Eight facts were displayed per framing condition; no facts were presented in the control condition. The duration of the video was four minutes and 28 seconds. Facts were shown sequentially in a text overlay to the video, each for a duration of 30 seconds. As an example, figure 1 shows a screen capture from the conservation-framing video.

Figure 1

Screen Capture of an Educational Fact portrayed in the Conservation-Framing Video



Value orientation was measured using the Environmental Portrait Value Questionnaire (E-VPQ; Bouman et al., 2018). The seventeen-item inventory measures the importance of altruistic, biospheric, egoistic, and hedonic values as guiding principles in respondents' lives. Each item contains a description of another person and what they find important in life. Each description represents a value, for example 'it is important to this person to respect nature' (biospheric value) or 'it is important to this person to have fun' (hedonic value). Each value is represented by three to five descriptions. On a seven-point scale, participants rated how similar the described person is to them (1 = not at all like me, 7 = very much like me). Participants were asked to avoid giving many statements a similar rating, in order to show a clear hierarchy of priorities. The present study only focused on participants' hedonic values ($M = 5.82$; $SD = 1.09$) and biospheric values ($M = 5.71$; $SD = 0.94$). In order to determine participants' value orientation, it was identified which value they had the highest mean score

on, and therefore prioritized the most. The E-VPQ had high in reliability in this study ($\alpha = .77$).

Conservation behavior intentions were assessed using the species- and biodiversity-oriented behaviors scales, adapted from Stern (2000) by Skibins and Powell (2013). The two five-item inventories respectively measure participants' intentions to engage in behaviors to directly benefit the species they saw ($\alpha = .87$), and biodiversity in general ($\alpha = .75$). Each item contains a statement of intended behavior, for example 'I will donate up to \$75 to adopt this animal at this site'. Responses are given on a nine-point scale ranging from 1 (= strongly disagree) to 9 (= strongly agree). Both scales were analyzed together as one, $M = 4.02$, $SD = 1.44$.

An attention check was embedded within the conservation behavior intention scale. Instead of a statement, one item read 'To show that you are still paying attention, please select Strongly Disagree as your answer for this statement.' Passing the attention check was required to be qualified for data analysis.

The complete scales used in the present study can be found in appendix C, translations to German and Dutch are provided in appendix D and E.

Procedure

Ethical approval for this study was granted by the Ethical Committee Psychology (ECP) affiliated with the University of Groningen, the Netherlands. Participants received a web link, which led them to the survey environment hosted on Qualtrics XM 2022. Participants were then able to choose their preferred language between English, Dutch, and German. All subsequent content was presented in the chosen language; scales and videos were translated by native speakers of the language within the research team. Before filling out

the questionnaire, participants were presented with the purpose and procedure of the study and filled out an informed consent form. Following the assessment of participants' demographics and value orientation, they were randomly assigned into one of the three conditions. All participants viewed the video. Then, a manipulation check prompted participants to select a fact they had seen during the video. There were three answer options; a) a fact from the conservation-framing condition, b) a fact from the fun-framing condition, and c) *'I didn't see any text'*, which corresponds with the control group. Participants had to select the answer corresponding with the condition they were in. Lastly, participants filled out the conservation behavior intention scale.

Results

The present study aimed to answer how effectively value-targeted framing in wildlife education can increase conservation behavior intentions for people with a hedonic value orientation. In order to test the effects of framing and value orientation on participants' intention to engage in different kinds of conservation behaviors, a 2x3 two-way ANOVA was conducted. Table 1 provides the mean scores and standard deviations of all groups on the conservation behavior intention scale.

Table 1

Descriptive Information of Group Scores on the PCB Intention Scale

	Biospheric CF	Biospheric FF	Biospheric Control	Hedonic CF	Hedonic FF	Hedonic Control
N	60	52	41	57	48	43

(M ± SD)	4.31 ± 1.27	4.63 ± 1.46	4.33 ± 1.59	3.43 ± 1.33	3.64 ± 1.41	3.77 ± 1.24
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Note. CF = conservation-framing condition; FF = fun-framing condition.

In order to determine whether the data met the assumptions for an ANOVA, checks were executed prior to data analysis. A boxplot inspection showed no outliers in the data. Shapiro-Wilk's normality test, which has shown higher power in the detection of non-normality in small samples ($n < 50$) compared to other tests (Mishra et al., 2019), was applied. It provided significant evidence against the null hypothesis of normal distributions at $\alpha = .05$ in one of the six groups, namely the hedonic orientation group in the conservation-framing condition ($p = .002$). As previous studies have demonstrated considerable robustness of the F-test even under non-normal distributions (Maxwell & Delaney, 2004; Blanca et al., 2017), and there was no significant evidence against normality in the rest of the groups we continued with the analysis. Levene's median-centered test for equality of variances, which has shown higher robustness under nonnormal distributions (Brown & Forsythe, 1974), was used and provided no significant evidence against the homogeneity of variances, $p = .298$.

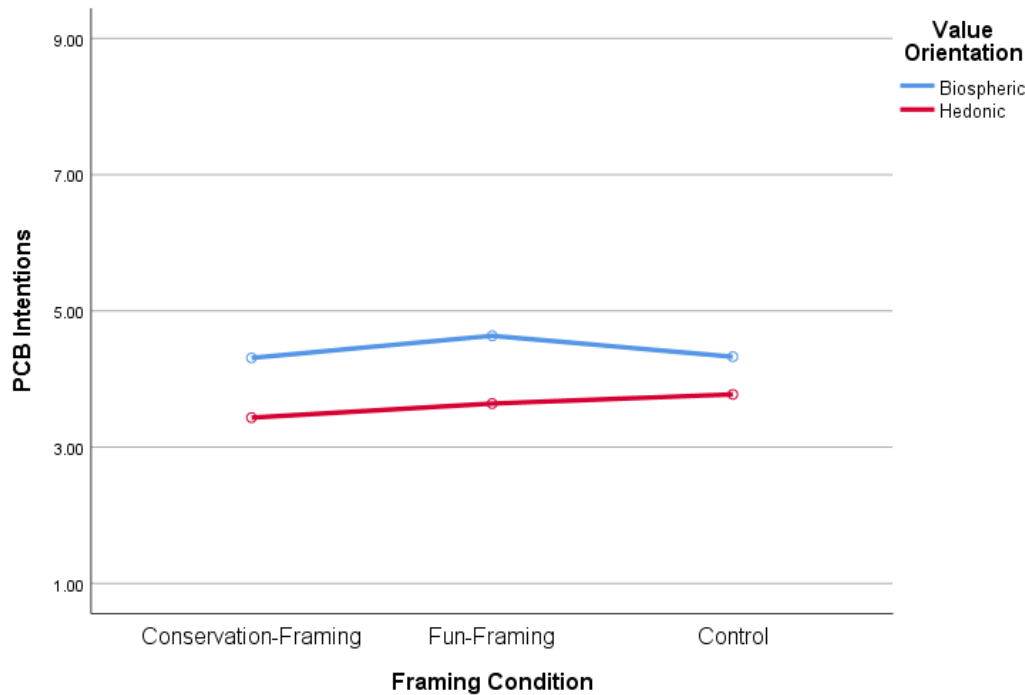
We hypothesized that participants with a hedonic orientation would have the highest conservation behavior intentions after viewing a fun-framing educational video, compared to the other experimental conditions. For participants with a biospheric orientation, no effect of framing had been anticipated. Since we expected the effect of framing to differ depending on participants' value orientation, we were interested in the interaction between the two. A two-way ANOVA provided no significant evidence against the null hypothesis of no interaction, $F(2, 295) = 0.619, p = .539, \text{partial } \eta^2 = .004$. Analyses for the main effects were conducted and indicated a significant main effect of value orientation on PCB, $F(1, 295) = 25.311, p < .001, \text{partial } \eta^2 = .079$. There was no statistically significant main effect of framing, $F(2, 295)$

= 1.047, $p = .352$, partial $\eta^2 = .007$. This finding provided no evidence for our hypothesis that the effect of framing would differ depending on participants' value orientation. Framing appeared to have no significant effect in our sample, only value orientation was a significant predictor of conservation behavior intentions.

Our second hypothesis was that participants with a biospheric orientation would indicate higher conservation behavior intentions than those with a hedonic orientation, regardless of the framing condition. Indeed, pairwise comparisons revealed that participants with a biospheric orientation gave significantly higher ratings on the conservation behavior intention scale than those with a hedonic orientation, $p < .001$. They had an unweighted marginal mean score of 4.424 ($SE = 0.113$) on the scale. In comparison, participants with a hedonic orientation had a mean score of 3.616 ($SE = 0.114$). These results support our hypothesis that participants with a biospheric orientation would indicate higher conservation behavior intentions than participants with a hedonic orientation. Figure 1 provides a visual representation of group scores on the conservation behavior intention scale. Bonferroni corrections were applied in all pairwise comparisons.

Figure 1

Mean Scores on the Conservation Behavior Intention Scale as a Function of Framing Condition and Value Orientation



Note. Responses on the conservation behavior intention scale were given on a nine-point scale ranging from 1 (= strongly disagree) to 9 (= strongly agree).

Discussion

To investigate how education can increase conservation behavior intentions among people with a hedonic value orientation, the present study designed targeted educational videos. As human activities threaten global biodiversity (see IPCC, 2022; WWF, 2020), previous research has repeatedly shown the importance of education to raise awareness of environmental issues (Moss et al., 2017; Lundberg et al., 2019). However, whether people adopt conservation behaviors is largely dependent on whether it is consistent with their stable value orientation (de Groot & Steg, 2009; Stern, 2000). The present study explored the potential of framing conservation as consistent with hedonic values, which have previously been suggested to be incompatible with many conservation behaviors (Steg et al., 2012). While conservation behaviors are often considered unpleasant (Steg et al., 2012), many

people like animals (see Barash, 2014; Godinez & Fernandez, 2019, Miller et al., 2020). We anticipated that framing animals as a source of enjoyment would motivate participants with a hedonic value orientation to adopt conservation behaviors, for the sake of protecting what brings them joy. However, the data showed no effect of framing on participants' behavioral intentions. Furthermore, in line with previous findings (Steg et al., 2012), we anticipated that participants with a biospheric orientation would indicate a higher willingness to adopt conservation behaviors than those with a hedonic orientation regardless of the framing condition. Our data supported this hypothesis. By once again showing the positive impact of a biospheric value orientation on conservation intentions, the present study reinforces values as relevant predictors in research on the promotion of conservation behaviors.

A potential explanation for the finding that framing did not increase the conservation behavior intentions of participants with a hedonic value orientation is that future enjoyment was not a sufficient motivator for them. As many people enjoy animals and learning about them (Godinez & Fernandez, 2019; Miller et al., 2020), we assumed that fun-framing education would motivate participants with a hedonic orientation to protect them, so that they could keep learning and interacting with them in the future. But perhaps, participants with a hedonic orientation were not concerned with how they would feel in the future. Indeed, some researchers define hedonic values as a desire for immediate, short-term wellbeing (Lindenberg & Steg, 2007; Winkler-Schor et al., 2020). Therefore, it may not be possible to motivate people with a hedonic orientation to adopt conservation behaviors if there is no immediate reward. As aforementioned, framing could be used to highlight the immediately enjoyable aspects of some conservation behaviors, such as riding a bike. However, most conservation behaviors are not considered intrinsically fun. The present findings suggest that it may not be possible to frame those behaviors as compatible with hedonic values.

Furthermore, it could be that hedonic values were not targeted successfully. In the present study, framing conditions were designed following Steg and colleagues' (2012) definition of hedonic values as “mainly focused on improving one’s feelings and reducing effort”. In order to appeal to participants with a hedonic value orientation, we focused on the first part of this definition – improving one’s feelings – while ignoring the effort aspect. Perhaps, communicating that conservation behaviors feel good does not suffice, and in order to motivate people with a hedonic orientation, one should find ways to also portray them as effortless.

Such considerations illustrate that values are highly abstract concepts, which was also noted by de Groot and Steg (2009). Hedonic values in particular seem to be vaguely defined. Defining them as “mainly focused” (Steg et al., 2012) on improving pleasure and reducing effort implies that they entail other, unnamed concerns. Furthermore, one can think of behaviors that satisfy either of these criteria, but not the other: For instance, many people enjoy doing sports, although – or even because – they are effortful. Value-targeted framing is an attempt to create conditions under which a target behavior becomes consistent with what a person wants. To do so, one needs to understand precisely what these conditions must be. Perhaps hedonic values are too abstract to define and target clearly. Following this line of argument, and based on findings from the present sample, one may conclude that it is not possible to frame conservation behaviors as consistent with hedonic values through educational videos.

An alternative explanation for why framing did not increase the conservation intentions of participants with a hedonic orientation is that they felt no personal responsibility, which has been said to mediate the effect of values on conservation behavior intentions (Punzo et al., 2019). Conservation behaviors are vital to ensure the survival of many species (IPCC, 2022). We assumed that fun-framing education would motivate participants with a

hedonic orientation to protect animals they like. However, this requires people to see their personal contribution to conservation as relevant. Research has shown that people with a hedonic orientation are more likely to shift the responsibility for conservation to others, while biospheric values are related to stronger feelings of environmental responsibility (Bateman & O'Connor, 2016). Therefore, although framing may highlight participants' enjoyment of animals, it may not be effective because participants with a hedonic orientation do not feel personally responsible to act.

In retrospect, including a measure of felt responsibility could have provided a better understanding of why framing had no effect on the relationship between values and conservation behavior intentions. If participants with a hedonic value orientation indeed felt less responsible to participate in conservation, as previous research suggests (Punzo et al., 2019; Bateman & O'Connor, 2016), future studies could aim to frame responsibility rather than values themselves.

Furthermore, our understanding of why framing was ineffective is limited by the fact that the present study included no measure of how participants perceived the educational videos. The fun-framing video was designed to be entertaining to participants and highlight their enjoyment of animals; however, it is unknown whether the manipulation had the desired effect. In that case, it may not be justified to conclude that value-targeted framing has no potential to inspire conservation behavior intentions; rather, the approach would need to be optimized. Therefore, future replications would benefit from a measure of participants' evaluations of the videos.

While the present study had limitations, it also had strengths. With participants from 26 different countries and an age range from 18 to 83, the present sample represents a diverse population. This is especially relevant considering our aim to increase conservation behaviors

through educational videos. Videos have the potential to reach people of all ages worldwide, regardless of whether on-site experiences with wildlife are accessible to them (Smith & Broad, 2008). The sample of the present study reflects the diversity of this target population, improving generalizability (Apicella et al., 2020).

Although we did not succeed in increasing conservation intentions among participants with a hedonic value orientation, the present findings have practical implications. As values might be too abstract to target, conservation education could be more effective if it focuses on specific and changeable predictors of conservation behaviors, such as peoples' emotional connection to wildlife (Skibins & Powell, 2013) and feelings of environmental responsibility (Punzo et al., 2019). Previous research on how to strengthen peoples' emotional bond and felt responsibility towards animals has highlighted the potential of up-close, real-life experiences with animals – for instance at interactive zoo exhibits (Skibins & Powell, 2013) or through volunteering projects (Ballard et al., 2017). Providing such opportunities could help environmental organizations to promote conservation behaviors.

However, the present study's aim was not only to increase conservation behaviors through education, but also to do this in an accessible way that can reach people regardless of their opportunities for close interactions with wildlife. Thus far, little research has been done on the potential of media education to foster peoples' emotional bond with animals or appeal to their feelings of responsibility. While some researchers argue that videos cannot create an emotional experience in the way real-life encounters with animals do, and are therefore not sufficient to increase peoples' interest in conservation (Miller et al., 2020), others have found that viewing live streams of animals can create equal – or even stronger – emotional connections to them compared to on-site viewing (Skibins & Sharp, 2018). In order to clear up this controversy, future research could aim to investigate under which conditions educational videos can engage viewers emotionally. It has been suggested that video quality

and length play a role (Miller et al., 2020); also, it could be that live streams are more effective than recorded videos (Skibins & Sharp, 2018). To the best of our knowledge, no research has yet been done on the potential of media education to increase felt environmental responsibility. However, considering the positive effect of personal involvement on felt environmental responsibility, it might be worthwhile to look into more interactive forms of digital education. For instance, future research could explore the potential of virtual zoo tours, in which visitors can view live streams of animals and learn about them online. Educational video games or social media groups about conservation, which foster active participation, could also be a promising approach to be explored in future study.

In conclusion, the present findings suggest that value-targeted framing cannot increase the effect of educational videos on peoples' intentions to adopt conservation behaviors. While values are reliable predictors of conservation intentions, they are stable as well as abstract – therefore, it is likely not possible to change them, nor to target them through the presenting of specific information. Therefore, targeting more changeable and specific predictors of conservation behaviors, such as peoples' emotional connection to wildlife or felt environmental responsibility, may be more effective. While studies have shown that both can be strengthened through close encounters with wildlife, more research on the potential of digital education is needed. As climate change is threatening biodiversity worldwide, the development of effective and accessible interventions to inspire conservation behavior is vital.

References

- Adelman, L. M., Falk, J. F., and James, S. (2010). Impact of national aquarium in Baltimore on visitors' conservation attitudes, behavior, and knowledge. *Curator* 43, 33–41. doi: 10.1111/j.2151-6952.2000.tb01158.x
- Apicella, C., Norenzayan, A., and Henrich, J. (2020). Beyond weird: A review of the last decade and a look ahead to the global laboratory of the future. *Evolution and Human Behavior*, 41(5):319–329.
- Ballard, H. L., Dixon, C. G. H., & Harris, E. M. (2017). Youth-focused citizen science: Examining the role of environmental science learning and agency for conservation. *Biological Conservation*, 208, 65–75. <https://doi.org/10.1016/j.biocon.2016.05.024>
- Bateman, T. S., & O'Connor, K. (2016). Felt responsibility and climate engagement: Distinguishing adaptation from mitigation. *Global Environmental Change*, 41, 206–215. doi:10.1016/j.gloenvcha.2016.11.001
- de Groot, J., & Steg, L. (2009). Mean or green: which values can promote stable pro-environmental behavior?. *Conservation Letters*, 61-66. doi: 10.1111/j.1755-263x.2009.00448.x
- Hofman, K., Hughes, K. (2018). Protecting the Great Barrier Reef: Analysing the impact of a conservation documentary and post-viewing strategies on long-term conservation behaviour. *Environmental Education Research*, 24(4), 521–536.
- Intergovernmental Panel on Climate Change [IPCC]. (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M.

- Craig, S. Langsdorf, S. Lösschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.
- Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal-frames guiding environmental behavior. *Journal of Social Issues*, 63, 117-137.
- Lundberg, P., Vainio, A., MacMillan, D., Smith, R., Veríssimo, D., & Arponen, A. (2019). The effect of knowledge, species aesthetic appeal, familiarity and conservation need on willingness to donate. *Animal Conservation*, 22(5), 432-443.
<https://doi.org/10.1111/acv.12477>
- Moss, A., Jensen, E., and Gusset, M. (2017). Impact of a global biodiversity education campaign on zoo and aquarium visitors. *Front. Ecol. Environ.* 243–247. doi: 10.1002/fee.1493
- Miller, L., Luebke, J., & Matiasek, J. (2018). Viewing African and Asian elephants at accredited zoological institutions: Conservation intent and perceptions of animal welfare. *Zoo Biology*, 37(6), 466-477. <https://doi.org/10.1002/zoo.21445>
- Miller, L., Luebke, J., Matiasek, J., Granger, D., Razal, C., Brooks, H., & Maas, K. (2020). The impact of in-person and video-recorded animal experiences on zoo visitors' cognition, affect, empathic concern, and conservation intent. *Zoo Biology*, 39(6), 367-373. <https://doi.org/10.1002/zoo.21565>
- Punzo, G.; Panarello, D.; Pagliuca, M.; Castellano, R.; Aprile, M. (2019). Assessing the role of perceived values and felt responsibility on pro-environmental behaviours: A comparison across four EU countries. *Environmental Science & Policy*, 101(), 311–322. doi:10.1016/j.envsci.2019.09.006

- Schwartz, S.H. (1992) Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. Pages 1–65 in M. Zanna, editor. *Advances in experimental social psychology*. Academic Press, Orlando
- Skibins, J., & Powell, R. (2013). Conservation caring: Measuring the influence of zoo visitors' connection to wildlife on pro-conservation behaviors. *Zoo Biology*, 32(5), 528-540. <https://doi.org/10.1002/zoo.21086>
- Skibins, J., & Sharp, R. (2018). Binge watching bears: efficacy of real vs. virtual flagship exposure. *Journal Of Ecotourism*, 18(2), 152-164. <https://doi.org/10.1080/14724049.2018.1553977>
- Smith, L., & Broad, S. (2008). Comparing Zoos and the Media as Conservation Educators. *Visitor Studies*, 11(1), 16–25. doi:10.1080/10645570801938392
- Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2012). The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions. *Environment And Behavior*, 46(2), 163-192. <https://doi.org/10.1177/0013916512454730>
- Stern, P.C. (2000). Toward a coherent theory of environmentally significant behavior. *J Social Issues* 56:407–424.
- Tribe, A., & Booth, R. (2003). Assessing the Role of Zoos in Wildlife Conservation. *Human Dimensions Of Wildlife*, 8(1), 65-74. <https://doi.org/10.1080/10871200390180163>
- Winkler-Schor, S., Riper, C., Landon, A., & Keller, R. (2020). Determining the role of eudaimonic values in conservation behavior. *Conservation Biology*, 34(6), 1404-1415. <https://doi.org/10.1111/cobi.13622>

WWF (2020). Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.

Appendix A**Complete List of Participant Nationalities**

Country	N
Albania	1
Austria	1
Argentina	1
Australia	1
Azerbaijan	1
Czech	4
Egypt	1
Germany	125
France	2
India	11
Ireland	2
Israel	1
Italy	5
Luxembourg	2
Mexico	1
Netherlands	74
Norway	1
Portugal	2
Romania	1
Scotland	1
Slovak	2

Sweden	1
Syria	2
Turkey	37
United States of America	18
United Kingdom	3

Appendix B

Educational Facts per Condition

Fun-framing condition

English

A tiger's urine smells like buttered popcorn.

A tiger's roar can be heard about 3 kilometers away.

Tigers have been around for a long time, about 2 million years.

Tigers can roar but not purr.

This zoo gives the opportunity to encounter tigers up to 10 meters close while remaining safe.

Every Wednesday, this zoo has Tiger training programs for the visitors to watch.

Twice a week, this zoo feeds the tigers by simulating a hunting act for zoo visitors to observe.

Next to the tiger exhibit, this zoo offers drinks for the visitors to enjoy while observing the tigers.

German

Das Urin eines Tigers riecht nach frischem Popcorn.

Das Brüllen eines Tigers kann man bis zu 3 Kilometer weit hören.

Tiger gibt es schon seit ungefähr 2 Millionen Jahren.

Tiger können brüllen aber nicht schnurren.

Dieser Zoo bietet die Möglichkeit, sich Tigern auf bis zu 10 Meter zu nähern und dennoch in Sicherheit zu sein.

Jeden Mittwoch gibt es in diesem Zoo ein Tiger-Trainingsprogramm, bei dem die Besucher zusehen können.

Zweimal pro Woche wird bei der Tigerfütterung eine Jagd simuliert, welche die Zoobesucher beobachten können.

In der Nähe des Tigergeheges bietet der Zoo Getränke an, die die Besucher genießen können, während sie die Tiger beobachten.

Dutch

De urine van een tijger ruikt naar (beboterde) popcorn

De brul van een tijger kan je wel op 3 kilometer afstand horen

Tijgers bestaan al heel lang, al ongeveer 2 miljoen jaar

Tijgers kunnen wel brullen maar niet spinnen

Deze dierentuin biedt bezoekers de mogelijkheid om de tijgers op een veilige manier van slechts 10 meter afstand te bekijken

Elke woensdag heeft deze dierentuin trainingsprogramma's met de tijgers waar bezoekers naar mogen kijken

Twee keer per week krijgen de tijgers te eten door het simuleren van een jacht waar de bezoekers naar mogen kijken

Deze dierentuin biedt drankjes aan voor de bezoekers om van te genieten tijdens het kijken naar de tijgers

Conservation-framing condition

English

Siberian tigers live in forests mostly untouched by humans. Out of all tiger species, their home has the most complete ecosystem.

In order to conserve the habitat of one tiger, approximately 10 000 hectares of forest have to be protected.

Tigers contribute to the health of ecosystems by keeping herbivore populations under control.

After a century of decline, tiger populations are stable or increasing in India, Nepal, Bhutan, Russia and China.

There are currently 287 Siberian tigers in the European breeding programme, providing opportunities for research and vet training.

This zoo donates to the International Union for Conservation of Nature tiger protection programme which has increased tiger populations on project sites by 40%.

Zoos teach visitors about threats tigers face and how everyone can help.

Zoo breeding programs lead to higher birth rates, gene diversity, and cub survival.

German

Sibirische Tiger leben in vom Menschen weitgehend unberührten Wäldern. Im Vergleich zu anderen Tigerarten hat das Zuhause der sibirischen Tiger das vollständigste Ökosystem.

Um den Lebensraum eines einzigen Tigers zu erhalten, müssen etwa 10 000 Hektar Wald geschützt werden.

Tiger unterstützen die Gesundheit des Ökosystems, indem sie dazu beitragen die Population von Pflanzenfressern kontrollieren.

Nach einem Jahrhundert des Rückgangs sind die Populationen des Sibirischen Tigers in Indien, Nepal, Bhutan, Russland und China stabil oder nehmen zu.

Derzeit befinden sich 287 sibirische Tiger im europäischen Zuchtprogramm, das Möglichkeiten für Forschung und tierärztliche Ausbildung bietet.

Dieser Zoo spendet für das Tigerschutzprogramm der Weltnaturschutzunion, welche die Populationen in verschiedenen Projekten bereits um 40 % erhöht hat.

Dieser Zoo informiert über die Bedrohungen denen Tiger ausgesetzt sind, und darüber, wie Besucher den Tigern helfen könne.

Das Tigerzuchtprogramm dieses Zoos führt zu einer höheren Geburtenrate, einer größeren Genvielfalt und einer höheren Überlebensrate der Jungtiere.

Dutch

Siberische tijgers leven in bossen die door mensen nauwelijks zijn aangetast. Van alle tijgersoorten hebben siberische tijgers het meest complete ecosysteem

Om de natuurlijke leefomgeving van één tijger te behouden moet ongeveer 10.000 hectare aan bos worden beschermd

Tijgers dragen bij aan gezonde ecosystemen door de herbivore populaties onder controle te houden

Na een eeuw aan bedreigingen zijn siberische tijgerpopulaties stabiel of nemen ze toe in India, Nepal, Bhutan, Rusland en China

Het Europese fokprogramma heeft op dit moment 187 Siberische tijgers. Het programma biedt mogelijkheden voor het opleiden van onderzoekers en dierenartsen.

Deze dierentuin draagt financieel bij aan het International Union for Conservation of Nature tijger-beschermingsprogramma, dat de tijgerpopulaties heeft doen toenemen met 40%

Deze dierentuin leert bezoekers over de dreigingen die tijgers ervaren en hoe iedereen hierbij kan helpen

Het fokprogramma van deze dierentuin leidt tot hogere geboortecijfers, genetische diversiteit, en overleving van tijgerwelpjes

Appendix C

Environmental Portrait Value Questionnaire (E-VPQ, Bouman et al., 2018)

Below you will find brief descriptions of different people. For each person we describe what is very important to them. Please read each description carefully and indicate how much this person is like you. The meaning of the scores is as follows:

1 means that the persons is totally not like you,

7 means that the person is totally like you.

The higher the score, the more the person is like you.

Please try to distinguish as much as possible in your answering by using different scores. The person that is most like you should thus receive the highest score. The person that is the least like you, the lowest.

Biospheric:

It is important to this person to prevent environmental pollution.

It is important to this person to protect the environment.

It is important to this person to respect nature.

It is important to this person to be in unity with nature.

Altruistic:

It is important to this person that every person has equal opportunities.

It is important to this person to take care of those who are worse off.

It is important to this person that every person is treated justly.

It is important to this person that there is no war or conflict.

It is important to this person to be helpful to others.

Hedonic:

It is important to this person to have fun.

It is important to this person to enjoy the life's pleasures.

It is important to this person to do things he/she enjoys.

Egoistic:

It is important to this person to have control over others' actions.

It is important to this person to have authority over others.

It is important to this person to be influential.

It is important to this person to have money and possessions.

It is important to this person to work hard and be ambitious.

Species- and Biodiversity-Oriented Behaviors (Adapted from Stern, 2000 by Skibins and Powell, 2013)

Please indicate the extent to which you agree with the following statements.

Species-oriented behavior:

I will donate up to \$75 to "adopt" this animal at this site

I will make a charitable contribution up to \$150 to help purchase habitat in the wild for this species

I will become a member of an organization committed to protecting this species, within the next 6 months

I will volunteer at an event designed to help the conservation of this species, within the next 6

months

Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal

Biodiversity-oriented behavior:

Even if I never return, I will provide ongoing financial support to this site

If asked, I would donate as much as \$50 to help protect a species I've never heard of

I will endorse a public policy that severely restricts future growth & development in order to protect wildlife

Elected officials' views on wildlife will be a major factor in my voting

Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation

Attention Check

To show that you are still paying attention, please select Strongly Disagree as your answer for this statement.

Appendix D

Environmental Portrait Value Questionnaire (E-VPQ, Bouman et al., 2018), German Translation

Im Folgenden sehen Sie kurze Beschreibungen verschiedener Personen. Für jede Person ist beschrieben, was für sie sehr wichtig ist. Bitte lesen Sie jede Beschreibung sorgfältig durch und geben Sie an, wie sehr diese Person Ihnen ähnlich ist. Die Bedeutung der Skala ist wie folgt:

1 bedeutet, dass die Person überhaupt nicht wie Sie ist,

7 bedeutet, dass die Person genau wie Sie ist.

Je höher die Zahl auf der Skala, desto mehr ähnelt die Person Ihnen.

Versuchen Sie bitte, Ihre Antworten so viel wie möglich zu unterscheiden, indem Sie verschiedene Zahlen auf der Skala verwenden. Die Person, die Ihnen am ähnlichsten ist, sollte also die höchste Punktzahl erhalten. Die Person, die Ihnen am wenigsten ähnlich ist, die niedrigste.

Biospheric:

Für diese Person ist es wichtig, die Umweltverschmutzung zu verhindern.

Dieser Person ist es wichtig, die Umwelt zu schützen.

Für diese Person ist es wichtig, die Natur zu respektieren.

Für diese Person ist es wichtig, in Einheit mit der Natur zu sein.

Altruistic:

Für diese Person ist es wichtig, dass jeder Mensch die gleichen Chancen hat.

Dieser Person ist es wichtig, sich um andere zu kümmern, denen es schlechter geht.

Für diese Person ist es wichtig, dass jeder Mensch gerecht behandelt wird.

Für diese Person ist es wichtig, dass es keinen Krieg oder Konflikt gibt.

Für diese Person ist es wichtig, anderen zu helfen.

Hedonic:

Für diese Person ist es wichtig, Spaß zu haben.

Für diese Person ist es wichtig, die Freuden des Lebens zu genießen.

Für diese Person ist es wichtig, Dinge zu tun, die ihr Spaß machen.

Egoistic:

Für diese Person ist es wichtig, die Kontrolle über die Handlungen anderer zu haben.

Für diese Person ist es wichtig, Autorität über andere zu haben.

Für diese Person ist es wichtig, einflussreich zu sein.

Für diese Person ist es wichtig, Geld und Besitztümer zu haben.

Für diese Person ist es wichtig, hart zu arbeiten und ehrgeizig zu sein.

Species- and Biodiversity-Oriented Behaviors (Adapted from Stern, 2000 by Skibins and Powell, 2013), German Translation

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen.

Species-oriented behavior:

Ich werde bis zu 75€ spenden, um dieses Tier zu "adoptieren".

Ich werde einen wohltätigen Beitrag von bis zu 150€ leisten, um den Erwerb von Lebensraum für diese Art in freier Wildbahn zu unterstützen.

Ich werde innerhalb der nächsten 6 Monate Mitglied einer Organisation werden, die sich für den Schutz dieser Tierart einsetzt.

Ich werde innerhalb der nächsten 6 Monate freiwillig an einer Veranstaltung teilnehmen, die der Erhaltung dieser Tierart dient.

Ich möchte aktuelle Informationen über die Pflege und Erhaltung dieses Tieres per Post/E-Mail erhalten.

Biodiversity-oriented behavior:

Auch wenn ich nicht mehr zurückkehre, werde ich diesen Zoo weiterhin finanziell unterstützen.

Ich würde bis zu 50€ für den Schutz einer Tierart spenden, von der ich noch nie gehört habe.

Ich werde Politik unterstützen, die zukünftiges Wachstum und Entwicklung stark einschränkt, um Wildtiere zu schützen.

Die Ansichten der Parteivertreter zum Thema Wildtiere werden bei meiner Wahlentscheidung eine wichtige Rolle spielen.

Auch wenn sie teurer oder schwieriger zu finden sind, werde ich Lebensmittel und Produkte kaufen, die zum Schutz von Wildtieren beitragen.

Attention Check

Um zu zeigen, dass Sie die Fragen aufmerksam lesen, wählen Sie bitte als Antwort auf diese Aussage "Stimmt überhaupt nicht zu".

Appendix E

Environmental Portrait Value Questionnaire (E-VPQ, Bouman et al., 2018), Dutch

Translation

Hieronder vindt u korte omschrijvingen van verschillende personen. We omschrijven voor elk persoon wat zeer belangrijk voor hem/haar is. Lees alstublieft elke omschrijving goed door en geef aan hoezeer deze persoon op u lijkt. De scores betekenen het volgende:

1 betekent dat deze persoon helemaal niet op u lijkt.

7 betekent dat deze persoon sterk op u lijkt.

Hoe hoger de score, hoe meer de persoon op u lijkt.

Probeer alstublieft zo veel mogelijk onderscheid te maken in uw antwoorden door verschillende scores te gebruiken. De persoon die het meest op u lijkt krijgt dus de hoogste score. De persoon die het minst op u lijkt, de laagste.

Biospheric:

Het is belangrijk voor deze persoon om milieuvervuiling te voorkomen.

Het is belangrijk voor deze persoon om het milieu te beschermen.

Het is belangrijk voor deze persoon om de natuur te respecteren.

Het is belangrijk voor deze persoon om in eenheid met de natuur te zijn.

Altruistic:

Het is belangrijk voor deze persoon dat iedereen gelijke kansen heeft.

Het is belangrijk voor deze persoon om te zorgen voor de mensen die het slechter hebben.

Het is belangrijk voor deze persoon dat ieder mens rechtvaardig wordt behandeld.

Het is belangrijk voor deze persoon dat er geen oorlog of conflict is.

Het is belangrijk voor deze persoon om behulpzaam te zijn voor anderen.

Hedonic:

Het is belangrijk voor deze persoon om plezier te hebben.

Het is belangrijk voor deze persoon om van de plezieren van het leven te genieten.

Het is belangrijk voor deze persoon om dingen te doen die hij/zij leuk vindt.

Egoistic:

Het is belangrijk voor deze persoon om controle te hebben over de acties van anderen.

Het is belangrijk voor deze persoon om gezag over anderen te hebben.

Het is belangrijk voor deze persoon om invloedrijk te zijn.

Het is belangrijk voor deze persoon om geld en bezittingen te hebben.

Het is belangrijk voor deze persoon om hard te werken en ambitieus te zijn.

Species- and Biodiversity-Oriented Behaviors (Adapted from Stern, 2000 by Skibins and Powell, 2013), Dutch Translation

Geef alstublieft aan in welke mate u het eens bent met de volgende beweringen.

Species-oriented behavior:

Ik wil tot 75 euro doneren om dit dier te "adopterem"

Ik wil een donatie doen tot 150 euro om te helpen bij de verwerving van leefruimte voor deze diersoort in het wild

Ik wil lid worden van een organisatie die zich inzet voor de bescherming van deze diersoort, binnen de komende 6 maanden

Ik zal binnen de komende 6 maanden als vrijwilliger deelnemen aan een evenement voor het behoud van deze diersoort

Voordat mijn bezoek voorbij is, zal ik mij aanmelden voor een mailing/e-maillijst om updates te ontvangen over de verzorging en het behoud van dit dier

Biodiversity-oriented behavior:

Zelfs als ik nooit terugkom, zal ik deze locatie financieel blijven steunen

Als ik gevraagd werd, zou ik 50 euro doneren om een diersoort te beschermen waar ik nog nooit van gehoord heb

Ik zal een overheidsbeleid steunen dat toekomstige groei en ontwikkeling streng beperkt om de wilde dieren te beschermen

De mening van gekozen vertegenwoordigers over wilde dieren zal een belangrijke factor zijn in mijn stemgedrag

Zelfs als ze duurder zijn of moeilijker te vinden, koop ik levensmiddelen en producten die het behoud van wilde dieren ondersteunen

Attention Check

Om aan te tonen dat u nog steeds oplet, gelieve Zeer Mee Oneens te kiezen als uw antwoord op deze stelling