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Heart Over Head: Highlighting Socio-Emotional Abilities in
Animal Videos to Increase Mental Similarity, Self-Species
Overlap and Conservation Support

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Abstract (German)

Der Verlust der Artenvielfalt hat ein kritisches Ausmaß erreicht und mehr als eine Million Arten sind inzwischen durch menschliche Aktivitäten vom Aussterben bedroht. Trotz weit verbreiteter Besorgnis sind die Schutzbemühungen nach wie vor unzureichend, sodass weitere Forschung zu wirksamen Maßnahmen zur Stärkung des Naturschutzes unabdinglich ist. Aktuelle Studien deuten darauf hin, dass die wahrgenommene Ähnlichkeit zwischen Menschen und Tieren Empathie und Unterstützung für Naturschutzinitiativen fördert. Auf der Grundlage des sozialen Ähnlichkeitsmodells von Nijssen et al. (2024) sowie auf Basis von Theorien zu mentaler Ähnlichkeit untersucht diese Studie, ob die Hervorhebung unterschiedlicher Fähigkeiten von Tieren die wahrgenommene mentale Ähnlichkeit zwischen sich selbst und bestimmten Tierarten beeinflusst und ob dies die Unterstützung für Naturschutzmaßnahmen verändert. In einem vorab registrierten, randomisierten Online-Experiment wurden 296 Teilnehmende dazu aufgefordert, sich Videos anzusehen, die die kognitiven, die sozio-emotionalen Fähigkeiten oder das neutrale Verhalten von Elefanten und Rabenvögeln zeigten. Anschließend wurden die mentale Ähnlichkeit, die Verbundenheit zur entsprechenden Tierart sowie die Unterstützung für Naturschutzmaßnahmen gemessen. In Übereinstimmung mit früheren Forschungsergebnissen zeigte die Studie, dass die Teilnehmenden bei allen Variablen ein höheres Engagement für Elefanten als für Rabenvögel aufwiesen. Darüber hinaus verstärkte die Hervorhebung sozio-emotionaler Fähigkeiten die wahrgenommene Verbindung zu beiden Tierarten. Das Ansehen von Videos, die sozio-emotionale Aspekte im Vergleich zu kognitiven Aspekten hervorhoben, führte zu einer höheren Unterstützung für den Artenschutz von Rabenvögeln, jedoch nicht von Elefanten. Mediationsanalysen unter Verwendung von PROCESS zeigten außerdem, dass die wahrgenommene mentale Ähnlichkeit die Verbundenheit zu den beiden Spezies positiv vorhersagte, was wiederum die Unterstützung für den Artenschutz bei Rabenvögeln vorhersagte. Allerdings wurde über alle Modelle hinweg keine

konsistente serielle Mediation beobachtet. Diese Ergebnisse unterstreichen die Bedeutung einer auf artspezifische Wahrnehmungen zugeschnittenen Kommunikationsstrategie für den Artenschutz und betonen den einzigartigen Wert der Hervorhebung der sozio-emotionalen Fähigkeiten von Tieren für bessere Ergebnisse im Artenschutz.

Abstract

Biodiversity loss has reached critical levels, with over one million species at risk of extinction due to human activities. Despite widespread concern, conservation efforts remain insufficient, necessitating research into effective interventions for increasing conservation support. Prior studies suggest that perceived similarity between humans and animals fosters empathy and support for conservation initiatives. Drawing on the social similarity framework by Nijssen et al. (2024) and theories of mind perception, this study investigates whether highlighting different mental abilities of animals can influence perceived mental similarity, self-species overlap, and conservation support. In a pre-registered, randomized online experiment 296 participants were assigned to watch videos presenting either cognitive abilities, socio-emotional abilities, or neutral behaviour of elephants and corvids. Consequently, mental similarity, self-species overlap, and conservation support were measured including a behavioural donation task involving a real financial incentive. Congruent with previous research, results indicated that participants reported higher species engagement across all variables for elephants compared to corvids. Further, highlighting socio-emotional abilities increased perceived connection with both animals. Viewing socio-emotional compared to cognitive videos led to higher conservation support for corvids but not for elephants, possibly due to pre-existing positive biases toward mammals. Mediation analyses using PROCESS further revealed that perceived mental similarity positively predicted self-species overlap, which in turn predicted conservation support for corvids. However, no consistent serial mediation was observed across models. These findings highlight the importance of tailoring conservation communication strategies to species-specific perceptions and underscore the unique value of highlighting socio-emotional animal abilities in enhancing conservation outcomes.

Keywords: biodiversity crisis, mental similarity, self-species overlap, conservation support, cognitive animal abilities, socio-emotional animal abilities

Heart Over Head: Highlighting Socio-Emotional Abilities in Animal Videos to Increase Mental Similarity, Self-Species Overlap and Conservation Support

As recently assessed by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), the world is currently experiencing an unprecedented biodiversity crisis with unseen species extinction rates (Díaz et al., 2019). Over the past 50 years, natural ecosystems have declined by half of their original size and one out of four animals is already threatened with extinction. While governments and international organizations have committed to ambitious conservation goals, progress has been rather poor to moderate. As evidenced by a recent review of Kidd et al. (2019) on conservation messaging, researchers and practitioners continue to demonstrate an inability to effectively induce behavioural change. The authors demonstrate that conservation messaging is frequently not grounded in a theoretical framework and mostly focused on education and increasing awareness. Additionally, Nielsen et al. (2021) suggest that the primary focus of research should centre on the generation of behavioural change in order to effectively engender conservation support on a global scale.

Mental Similarity, Self-Species Overlap and Conservation Support

Recent research has indicated that augmenting the perceived similarity between humans and animals may serve as a promising mechanism to foster conservation support (Nijssen et al., 2024). As previous studies suggest, humans tend to generally favour and show more empathy and compassion towards animals that exhibit a greater degree of physical similarity to themselves (Batt, 2009; Miralles et al., 2019), a phenomenon that is also described as the *taxonomic bias*. In a series of studies Müller et al. (2014) showed that emphasizing human-like behaviour of non-human agents in videos can increase the perceived closeness and the amount of donations towards these agents. Additionally, Lundberg et al. (2019) assessed the level of financial support individuals are willing to donate for different species of animals and revealed that mammals received 29% more

funding in comparison to birds. This further underscores the importance of the taxonomic bias, as it carries implications for real-world behaviour, such as monetary donations. Moreover, the propensity to favour species that are more similar to us is not solely limited to physical characteristics; it also manifests in mental attributes. *Mental similarity*, also referred to as mind perception or belief in animal mind, can be described as the extent to which we believe animals have mental states such as thoughts, intentions and emotions (Hills, 1995). Research suggests that a greater belief in animal mind is associated with higher levels of empathy and moral concern as well as less support for animal use (Amiot et al., 2020; Hills, 1995; Knight et al., 2004). A concept closely related to mental similarity is that of perceived *self-species overlap*, which can be defined as the subjective connection or attachment to a specific species (Amiot et al., 2020; Nijssen et al., 2024). Individuals who experience a heightened sense of connection to a particular species demonstrate a propensity to increased contact with and assistance to these species.

The social similarity framework of cross-species interaction by Nijssen et al. (2024) synthesises these findings and proposes that higher levels of perceived species similarity increase species engagement. Within the framework, social similarity is categorised into two distinct dimensions: physical similarity, encompassing visual, auditory and kinematic cues, and mental similarity, encompassing cognitive and affective abilities of animals. Additionally, species engagement comprises three distinct dimensions: moral concern for animal wellbeing, self-species overlap with animals, and conservation support. In three subsequent studies, the authors examined the impacts of social similarity for various species across the taxonomic spectrum. The results suggest that participants experience higher levels of connection and moral concern for species that are physically and mentally more similar to humans. Consistent with their assumptions, effect sizes were considerably higher for mental in comparison to physical similarity although this tendency appeared to be reversed in an experimental study, necessitating cautious

interpretation. Further, the authors found correlational evidence that increased mental similarity is associated with an increase in conservation support. However, this finding could not be replicated in an experimental study.

Dimensions of Mental Similarity

In the context of animal mental abilities, previous literature has frequently identified two distinct dimensions. Examining the capabilities of thirty-six different species, Callahan et al. (2021) identified two factors which they termed *cognitive* and *emotive* traits. Whereas cognitive traits are defined as including general intelligence, problem-solving skills and planning, emotive traits are described as encompassing the experience of complex emotions, creativity and the ability to empathise with other species. Comparably, Gray et al. (2007) distinguished between the two dimensions *agency* (e.g. the capacity to control one's actions, moral decision making, and planning of actions) and *experience* (e.g. the capacity to feel emotions such as hunger, rage, pain, and pride, as well as the ability for consciousness), a distinction that has been employed in numerous other studies (Gray et al., 2012; Potocka, 2022; Potocka & Bielecki, 2023; Waytz et al., 2010).

Moreover, research findings indicate that experiencing or emphasising diverse dimensions of mind perception can have different consequences. Gray et al. (2012) established a link between the two dimensions of mind perception and moral judgments. The authors proposed that higher levels of the perception of experience are associated with the attribution of moral rights and the status of a moral patient, who undergoes or derives benefit from either good or bad outcomes. Conversely, a perception of high agency is associated with moral responsibility and a status as a moral agent, who is capable of actively performing good or bad actions. Potocka (2022) found that participants were less inclined to accept instrumental violence against animals when they ascribed higher levels of experience to animals. These results are interpreted in a way that animals

with a high level of experience are regarded as moral patients with rights, including the right to not be harmed, and therefore require protection from violence (Potocka & Bielecki, 2023). A related idea differentiates between the dimensions *competence* and *warmth* based on the stereotype content model (SCM) by Cuddy et al. (2008). Research suggests that the portrayal of animals as warm – that is to say, as friendly or helpful – induces behaviour that is predominantly active. This active behaviour may take the form of active support or the active mitigation of harm. On the other hand, the portrayal of animals as competent, including attributes of intelligence and skill, has been shown to predominantly result in passive behaviour (Sevillano & Fiske, 2019). Additionally, Neves et al. (2022) utilised the SCM to analyse relationships with conservation research in the context of sharks. Their results indicate that the perception of sharks as warm animals is associated with increased positive emotions towards sharks. This, in turn, is associated with more positive attitudes towards their conservation and a higher preference for donating to shark conservation initiatives. Similarly, perceiving sharks as competent resulted in more positive attitudes. In their study, Crisante et al. (2024) examined various pets from different animal groups and found that animals perceived to have greater cognitive abilities were attributed both an increased capacity to suffer and to form an emotional bond with their owner. The findings, when considered as a whole, illustrate the significant consequences of the two dimensions of mind perception and underline the necessity to separately analyse them in further research.

Use of Videos in Conservation Research

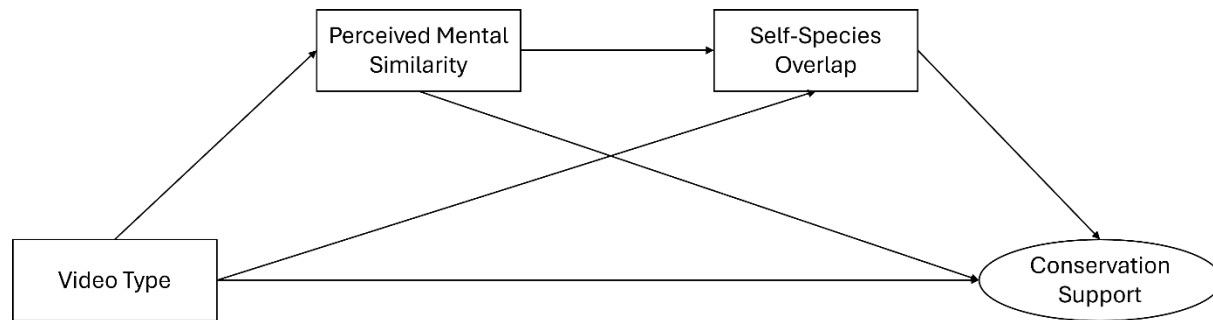
In order to identify interventions for inducing behavioural change with regard to biodiversity conservation, audio-visual media may have the potential to serve as an effective tool. Nevertheless, the use of video footage in research pertaining to biodiversity conservation is a relatively recent approach, with a shortage of studies examining its effectiveness (Kleinhenz & Parker, 2017). Previous studies have indicated that the viewing of animal documentaries has the

potential to enhance knowledge and species engagement, including a positive influence on attitudes towards insects and an increase in empathy towards them (Barbas et al., 2009). Pearson et al. (2013) presented an emotional documentary of orangutans to university students and compared its effects to a factual slide-show presentation. Following the viewing of the documentary, the participants demonstrated an enhancement in their knowledge, a more positive attitude towards orangutans, and an increase in short-term support for orangutan conservation. Furthermore, watching animal videos has been demonstrated to enhance the likelihood and magnitude of donations (Shreedhar & Mourato, 2019) as well as to strengthen support for the Endangered Species Act among students (Kleinhenz & Parker, 2017). However, other studies have investigated the effectiveness of animal videos in the context of zoos and found no significant effects of animal videos on knowledge, attitudes or conservation support (Miller et al., 2020), necessitating a further investigation into the effectiveness of animal videos.

Present Study

The present study acknowledges the findings of the research that has been presented and endeavours to delve deeper into the proposed framework regarding mental similarity and its effects. The presentation of brief animal videos is intended to build upon extant research regarding the efficacy of media in the context of biodiversity conservation. Furthermore, the consequences of the two dimensions of mental similarity are investigated independently, thus extending the social similarity framework of cross-species interaction as established by Nijssen et al. (2024). In the context of an experimental design, participants were exposed to videos that either accentuated cognitive abilities of animals, socio-emotional abilities, or no specific abilities. The influence of these videos on perceived mental similarity with the animal, perceived connection to the specific animal, and support for the conservation of the animal was then analysed. In line with previous research, it was assumed that highlighting mental abilities would positively influence species

engagement in general. In more detail, presenting videos highlighting *cognitive* abilities of animals in comparison to presenting videos without highlighting any specific animal abilities would lead to increased mental similarity, self-species overlap and conservation support (H1). Similarly, presenting videos highlighting *socio-emotional* abilities of animals in comparison to showing videos without highlighting any specific animal abilities would lead to increased mental similarity, self-species overlap and conservation support as well (H2). Moreover, the objective of the present study was to make a direct comparison between the two dimensions of mental similarity. In view of the paucity of research on the effects of both dimensions, no direction was proposed in this case. Instead, it was assumed that presenting videos highlighting *socio-emotional* abilities of animals in comparison to showing videos highlighting *cognitive* abilities would result in divergent influences on mental similarity, self-species overlap and conservation support (H3). Additionally, in accordance with the framework by Nijssen et al. (2024) a mediation analysis was conducted to ascertain the association between the variables. Therefore, it was hypothesized that mental similarity and self-species overlap serially mediate the relationship between mental animal abilities (cognitive and socio-emotional) and conservation support in a way that highlighting mental animal abilities in videos in comparison to showing videos without highlighting any specific animal abilities is associated with an increase in mental similarity. In turn, increased mental similarity leads to an increased self-species overlap and increased self-species overlap leads to increased conservation support (H4). Additionally, it was hypothesized that the association between highlighting different animal abilities (cognitive vs. socio-emotional) and conservation support is serially mediated by mental similarity and self-species overlap (H5). An illustration of the serial mediation model can be found in Figure 1. All hypotheses and analyses were preregistered via OSF (<https://osf.io/fdyzu>), variations from the preregistration are mentioned in the text.

Figure 1*Serial Mediation Model*

Method

Participants & Data Collection

In order to participate in the experiment, participants had to sign consent prior to participating, be 18 years old or older and have a high level of German language. As preregistered, participants completed an attention check during the experiment and were excluded from the analysis when they failed the attention check. Additionally, participants were asked whether all presented videos were displayed correctly. If participants negated the question, they were excluded from the analysis as well. Further, a manipulation check was used to test whether the video was understood as intended (see Experimental Procedure for details). If participants failed the manipulation check, they were excluded from the analysis since including the data in the analysis could lead to confounding effects. Participants were recruited via social media (e.g. WhatsApp, Instagram, LinkedIn), through word-of-mouth and by using the online platform SurveyCircle (<https://www.surveycircle.com/de>). Data collection was restricted to one month. Among all participants a reward of 30 euros was distributed to a randomly selected participant. An a priori power analysis with G*Power Version 3.1.9.7 (Faul et al., 2009; Faul et al., 2007) approximated that 186 participants would be needed to detect a small effect ($f^2 = 0.078$) with 90%

power, using a linear multiple regression analysis with three predictors and a statistical significance level of $\alpha = .05$. The expected effect size was based on previous comparable research (Nijssen et al., 2024). In total, 504 participants started the experiment, of which 139 were excluded due to termination of the experiment before completion. After application of all exclusion criteria, the data of 296 participants (225 female, 8 diverse) between 18 and 86 years of age ($M = 26.80$, $SD = 11.12$) were included in the analysis.

Materials

Videos

Participants watched different videos which can be separated into three types: neutral, cognitive and socio-emotional. All videos were rather short and of similar length between 19 and 26 seconds. The videos were taken from and embedded in YouTube (<https://www.youtube.com/>) and above each video a short description of what can be seen in the video was presented. After each video, participants were asked whether the video was displayed correctly and whether the video highlighted social and/or emotional, cognitive or no specific abilities of animals. The two animals presented in the experiment were elephants and corvids. Videos in the neutral condition showed both animals walking through their natural habitat without appearing to pursue any further goal or intention. Videos within the cognitive condition highlighted the cognitive abilities of animals by showing how they use certain tools to achieve a goal. One video showed an elephant drawing a portrait of itself whereas the other video displayed a corvid that sorts different cups by size to receive a reward of a human. In the socio-emotional condition the videos highlighted the social and/or emotional abilities of the presented animals. One video displayed an elephant calf that chases a group of birds, falls over and runs to its mother. The other video in this condition showed a group of corvids demonstrating a family bonding ceremony by moving up and down together

simultaneously. All videos in full length can be found in the associated channel

(<https://www.youtube.com/playlist?list=PLAVEbDy-uOxzAfb3T9BJIRmWlx-1TqCP>).

Mental Similarity

The perceived similarity between the participant and the respective animal was measured with a German translation of the Mind Perception scale by Gray et al. (2007). The scale was translated into German by two native speakers following a forward- and backward-translation procedure. Any divergence between the two translations was resolved by the translators who agreed on the final version of the translation. All 18 items were measured on a scale from 0 (*not at all*) to 100 (*completely*) and can be found in Appendix A. The scale is originally divided into two subscales: *experience* and *agency*. However, an overall mental similarity score was created by calculating the mean of all items of the scale since the subscales highly correlated for both animals elephants ($r(294) = .71, p < .001$) and corvids ($r(294) = .79, p < .001$). Further, the reliability of the scales was assessed using Cronbach's Alpha. Both scales demonstrated excellent reliability, with $\alpha = .91$ for elephants and $\alpha = .93$ for corvids.

Self-Species Overlap

The perceived overlap between oneself and the respective animal was measured with a validated German adaptation of the Inclusion of Nature in the Self scale by Aron et al. (1992). Participants were instructed to choose a picture which fits their perception of overlap between themselves and the respective animal. Then, seven pictures with different degrees of overlap were presented using overlapping circles that represent either the participant or the animal resulting in a score from one to seven. The exact instruction and all pictures can be found in Appendix A.

Conservation Support

The amount of conservation support for each species was measured by using a donation task similar to Nijssen et al. (2024). Participants received 30 lottery tickets and had a chance to win

a reward of 30 euros for participating in the study. To measure conservation support, they were asked whether they are willing to donate a certain amount of their lottery tickets to a non-governmental organization committed to the conservation and protection of endangered animals and plants. Participants were asked to donate for elephants and corvids separately. The sum of all donations and the amount of money the participants want to keep for themselves was set to 30 resulting in a score from 0 to 30 for each animal. Further, it was emphasized that the measurement is not hypothetical. If the winning lottery ticket was a donated ticket, the reward of 30 euros would be donated to the respective organization. If not, a participant would receive the reward. Therefore, email addresses were collected optionally at the end of the study and stored separately from the data to be able to contact the winning participant. A random selection process resulted in the entire amount being donated to an organization that is committed to the conservation of corvids, as a participant was selected who decided to donate all of his or her money to corvids. Exact instructions in German can be found in the Appendix A.

Covariates: Age, Gender and General Donation Behaviour

General donation behaviour was measured by asking participants how often within the last five years they have donated to an organization for the protection of plants and animals. Participants chose between ‘never’, ‘one to two times’, ‘three to four times’, ‘five to six times’ or ‘more than seven times’. Additionally, age (in years), gender (female/male/non-binary/not specified) and the ability to communicate in German in daily conversations and to express complex thoughts (yes/no) were measured regarding demographic data.

Experimental Design

The study was conducted as an online survey study using the survey creation tool Qualtrics (<https://www.qualtrics.com>). The experiment contained a 3 x 2 mixed design with condition (neutral vs. cognitive vs. socio-emotional) as between-subject factor and animal (elephant vs.

corvid) as within-subject factor. Assignment to conditions was randomized and all three outcome variables were measured for all conditions and animals respectively. After a short explanation of the content of the study participants signed informed consent. Then, participants entered demographic data such as age and gender and confirmed that they are able to use German language in everyday life and for building complex sentences. Afterwards they were assigned to one of the three conditions. In all conditions participants responded to two blocks each consisting of an animal video followed by a manipulation check, mental similarity measures regarding the respective animal and measures of perceived self-species overlap with the respective animal. Within the measures of mental similarity questions were presented in random order. After all blocks conservation support and general donation behaviour was measured. In the end, participants were able to enter their email address in order to participate in the lottery and could state any additional comments. Further, the background of the study was clarified. In the cognitive condition participants viewed two videos highlighting cognitive abilities of the respective animal whereas in the socio-emotional condition social and/or emotional abilities were highlighted. In the neutral condition no specific abilities of animals were highlighted (see Material for details). Animals were presented in random order to prevent sequence effects since the depicted animals and videos could differ.

Data Preprocessing and Analysis

All analyses were conducted using SPSS Version 29.0.0.0 with a standard $p < 0.05$ criteria to test for significance. Generally, statistical tests were conducted using two-tailed significance tests unless otherwise specified. One-tailed tests were used when a specific directional hypothesis was theoretically justified. Prior to conducting any statistical analysis, the assumptions were examined. Continuous variables were analysed at interval level and observations were independent. Shapiro-Wilk tests indicated violations of normality for most variables. Additionally,

homoscedasticity was not given according to a significant Box's M test with a value of 80.55 and $p < .001$. Due to a large sample size and robust statistical measurements both violations were considered negligible. Following data exclusion procedures and recoding, repeated measures multivariate analysis of variance (RM-MANOVA) was used to compare between the different conditions. Other than planned in the preregistration, solely one RM-MANOVA was calculated to compare between the different conditions in order to examine the first three hypotheses. Regarding independent variables, condition (neutral vs. cognitive vs. socio-emotional) was included as between-subjects and animal (elephants vs. corvids) as a within-subjects factor. Mental similarity, self-species overlap, and conservation support were included as dependent variables. In order to further examine differences between dependent variables, one-way analyses of variance (ANOVA) were conducted for each of the three outcome variables separately. Post-hoc comparisons using Tukey's HSD were conducted to analyse differences between conditions.

Regarding the fourth and fifth hypothesis, blockwise regression and mediation analysis were used. For both analyses, separate models were calculated comparing between general mental ability conditions (cognitive and socio-emotional) and the neutral condition (H4) as well as between the cognitive and the socio-emotional condition (H5). Although the preregistration specified that mental similarity, self-species overlap and conservation support would be averaged across both animal species, further diagnostic checks revealed that this aggregation introduced non-linear patterns in the residuals and violations of homoscedasticity & linearity which distorted the outcome distribution. Additionally, the results of the RM-MANOVA confirmed that attitudes and behaviours differed significantly between species, indicating that the two animals were not perceived equivalently. To preserve the integrity of the statistical assumptions and more accurately reflect species-specific effects, both animals were analysed separately for all regression analyses. These considerations resulted in four distinct models, comparing between general mental ability

conditions and the neutral condition as well as comparing between the cognitive and the socio-emotional condition for both animals, respectively. Variance Inflation Factors (VIF) were used to examine multicollinearity amongst the predictors. Since VIFs for all variables were found to be less than 1.2, there was no evidence for the presence of multicollinearity. In order to include gender into the analysis, the categorical variable (0 = male, 1 = female, 2 = diverse) was dummy coded with male as the reference group. Two dummy variables were created for the purpose of the study: one comparing female vs. male, and one comparing diverse vs. male. These variables were included as covariates within the blockwise regression analyses. The remaining predictors were considered continuous or dichotomous (condition).

As a first step, blockwise regression analyses were performed separately for all four models with conservation support as the outcome variable. The following predictors were subsequently added to the model: condition (in the first block), mental similarity (in the second block), self-species overlap (in the third block), age, gender and general donation behaviour (in the last block). In the second step, PROCESS Model 6 (Hayes, 2017) was used to analyse the serial mediation hypotheses for all four models. The analyses were conducted using the PROCESS macro implemented in SPSS. Condition was employed as the predictor (X), mental similarity as the primary mediator (M1), self-species overlap as the secondary mediator (M2), and conservation support as the outcome (Y). Indirect effects were estimated using bootstrapping, with 5,000 resamples and 95% confidence intervals (Zhao et al., 2010). The covariates age, gender and general donation behaviour were added to the model as well. Gender was initially assessed with three categories: male, female, and diverse. Due to the very small number of participants in the last group ($n = 8$), the bootstrapping procedure in PROCESS repeatedly failed when including this group as a dummy-coded covariate. To obtain stable and interpretable model estimates, participants in the last group were excluded from the mediation analysis resulting in a marginally

smaller sample size. The mediation analysis was thus conducted using a binary gender variable (female vs. male), with male serving as the reference category. Analyses were conducted excluding gender as a covariate and compared, but the same effects were observed. Implications and further considerations are addressed in the discussion.

Results

Descriptive Statistics

All descriptive statistics of the main variables can be found in Table 1. In general, the descriptive statistics indicate higher scores for mental similarity, self-species overlap and conservation support for elephants in comparison to corvids across all conditions. When comparing means between conditions, descriptives show highest scores in the socio-emotional condition, followed by the cognitive and the neutral condition for all main variables. However, an exception emerges when examining conservation support for corvids, where the lowest scores are observed in the cognitive condition. Descriptive statistics of covariates age, gender and general donation behaviour can be found in the Appendix B, Table B1.

Correlational analysis was assessed to examine relationships between all variables separately for both animals. Mental similarity and self-species overlap showed a weak positive correlation in elephants, $r(294) = .27, p < .001$, whereas conservation support was not significantly correlated with neither mental similarity, $r(294) = .04, p = .516$, nor self-species overlap, $r(294) = .09, p = .109$. Examining correlations for corvids, mental similarity showed a moderate positive correlation with self-species overlap, $r(294) = .47, p < .001$, and a weak positive correlation with conservation behaviour, $r(294) = .15, p = .011$. Additionally, a weak positive correlation of self-species and conservation support was found in corvids, $r(294) = .23, p < .001$.

Table 1*Descriptive Statistics of Main Variables Separated by Condition and Animal*

	Condition							
	Overall		Neutral		Socio-emotional		Cognitive	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mental similarity	74.72	15.25	72.49	15.01	76.84	14.95	74.64	15.59
Elephants	78.42	14.22	76.70	1.51	80.56	1.39	77.90	1.39
Corvids	71.03	17.88	68.29	1.92	73.12	1.75	71.38	1.73
Self-Species Overlap	3.33	1.64	3.00	1.50	3.68	1.67	3.28	1.67
Elephants	3.75	1.8	3.39	0.18	4.21	0.18	3.61	0.17
Corvids	2.91	1.77	2.61	0.18	3.14	0.19	2.94	0.17
Conservation Support	11.80	5.16	11.29	5.70	12.62	4.09	11.48	5.50
Elephants	12.77	7.84	11.92	0.93	13.25	0.67	13.03	0.77
Corvids	10.83	7.23	10.65	0.92	12.00	0.62	9.94	0.64

Note. $N = 296$ for overall, $n = 89$ for neutral, $n = 98$ for socio-emotional, $n = 109$ for cognitive

Repeated Measures Multivariate Analysis of Variance (RM-MANOVA)

A 2 x 3 RM-MANOVA with animal (elephants vs. corvids) as within-subject factor and condition (neutral vs. socio-emotional vs. cognitive) as between-subject factor indicated significant differences between animals, $F(3, 291) = 59.46$, $p < .001$, Pillai's trace = 0.38, partial $\eta^2 = .38$, but not between conditions, $F(6, 584) = 1.91$, $p = .077$, Pillai's trace = 0.38, partial $\eta^2 = .02$. The interaction between animal and condition was also not significant, $F(6, 584) = 1.60$, $p = .145$, Pillai's

trace = 0.03, partial $\eta^2 = .02$. Separate univariate analyses for differences between animals indicated significant differences for mental similarity, $F(1, 293) = 143.50, p < .001$, partial $\eta^2 = .33$, self-species overlap, $F(1, 293) = 106.24, p < .001$, partial $\eta^2 = .27$, and conservation support, $F(1, 293) = 8.48, p = .004$, partial $\eta^2 = .03$. Across all dependent variables, scores were found to be significantly higher for elephants in comparison to corvids. Separate univariate analyses for differences between conditions revealed significant differences for self-species overlap, $F(2, 293) = 4.17, p = .016$, partial $\eta^2 = .03$. Mental similarity, $F(2, 293) = 1.91, p = .150$, partial $\eta^2 = .01$, and conservation support, $F(2, 293) = 1.91, p = .150$, partial $\eta^2 = .01$, did not differ significantly from each other, dependent on the condition. Post-hoc comparisons using Tukey's HSD indicated a significant difference between the neutral and socio-emotional condition ($p = .013$) with higher scores for self-species overlap in the socio-emotional condition. No other significant differences were found in post-hoc comparisons.

Blockwise Regression

For elephants, blockwise regression analysis showed no significant increase in explained variance in either model after subsequently adding condition, mental similarity and self-species overlap. In both models, age appeared to be the sole predictor that significantly increased R^2 , with older people donating more to conservation organisations. In the first model (comparing mental ability conditions and the neutral condition), the inclusion of covariates in the model significantly increased the adjusted R^2 to 8%. For comparisons between the cognitive and the socio-emotional conditions, including covariates in the model increased the adjusted R^2 to 6.1%.

For corvids, the analysis for comparisons between the general mental ability conditions and the neutral condition showed a significant increase in the adjusted R^2 to 1.5% after adding mental similarity, and an increase to 4.7% after adding self-species overlap to the model. The findings indicate that participants with higher levels of mental similarity and self-species overlap

showed increased conservation support. However, after adding self-species overlap in the third block, mental similarity was no longer found to be significant. When comparing the cognitive and the socio-emotional conditions, the analysis indicated significant increases in explained variance for all relevant variables. Adding condition to the model increased the adjusted R^2 to 2%, suggesting that participants donate more to conservation support after watching videos highlighting corvids' socio-emotional abilities than after watching videos highlighting cognitive abilities. Subsequently including mental similarity and self-species overlap increased the adjusted R^2 to 5.1% and 8.7% respectively, indicating a positive relationship with conservation support for both variables. However, only condition and self-species overlap remained significant once all variables and covariates were added to the model. The incorporation of covariates in the model did not significantly increase the explained variance in either model. Detailed results of the blockwise regression analysis for all variables and covariates, including regression tables, can be found in the Appendix B.

Serial Mediation Analysis

For elephants, mediation analysis revealed no significant total effect ($B = 1.32$, $SE = 0.98$, $p = .181$) or direct effect ($B = 1.16$, $SE = 1.00$, $p = .245$) and no significant total indirect effect ($B = 0.16$, $SE = 0.19$, 95% CI [-0.16, 0.58]) of condition (mental abilities vs. neutral) on conservation support. Self-species overlap was significantly predicted by mental similarity indicating that participants who report higher levels of mental similarity to elephants experience more overlap with them. All other associations remained non-significant. A comparison of the socio-emotional and the cognitive condition revealed that the total effect ($B = -0.18$, $SE = 1.02$, $p = .856$), direct effect ($B = -0.08$, $SE = 1.04$, $p = .943$) and total indirect effect ($B = -0.11$, $SE = 0.25$, 95% CI [-0.61, 0.41]) did not show significance. However, self-species overlap was significantly predicted by condition and mental similarity. Participants that watched a video highlighting the socio-emotional abilities of

elephants felt closer to elephants in comparison to watching a video highlighting their cognitive abilities. Further, age was found to be significant for both self-species overlap (only in the first model) and conservation support (in both models) with younger people showing higher levels of overlap but donating less to elephant conservation. Additionally, male participants donated less to elephant conservation in comparison to female participants although this association attained only a marginal level of statistical significance. Detailed results for elephants including standardized coefficients can be found in Table 2 and 3.

For corvids, the analysis did not show a significant total indirect effect ($B = 0.44$, $SE = 0.27$, 95% CI [-0.05, 1.00]), total effect ($B = 0.14$, $SE = 0.94$, $p = .886$) or direct effect ($B = -0.31$, $SE = 0.92$, $p = .739$) of condition (mental abilities vs. neutral) on conservation support. However, mental similarity was a significant predictor for self-species overlap and self-species overlap significantly predicted conservation support, both in a positive relationship. Comparing the socio-emotional and the cognitive condition results indicate a significant total effect ($B = -2.05$, $SE = 0.93$, $p = .028$), but no significant direct effect ($B = -1.75$, $SE = 0.90$, $p = .052$) or total indirect effect ($B = -0.30$, $SE = 0.30$, 95% CI [-0.94, 0.24]). This suggests that participants who watched videos of corvids highlighting socio-emotional abilities donated significantly higher amounts to conservation support in comparison to participants watching videos highlighting cognitive abilities of corvids. Further, mental similarity significantly predicted self-species overlap, which, in turn, significantly predicted conservation support. With regard to the covariates, age was found to be a significant predictor of self-species overlap in both models with younger people showing higher levels of overlap. General donation behaviour was found to be significant for mental similarity in all four models with people generally donating more experiencing higher mental similarity. The associations that were not mentioned remained non-significant. Detailed results for corvids including standardized coefficients can be found in Table 4 and 5.

Table 2

Detailed Results of Mediation Analysis Comparing Mental Ability Conditions and Neutral Condition for Elephants

Predictor	On Mental similarity					On Self-species overlap					On Conservation support				
	β	<i>SE</i>	<i>p</i>	95% CI		β	<i>SE</i>	<i>p</i>	95% CI		β	<i>SE</i>	<i>p</i>	95% CI	
				<i>LL</i>	<i>UL</i>				<i>LL</i>	<i>UL</i>				<i>LL</i>	<i>UL</i>
Video Type ^a	.18	1.78	.152	-0.95	6.08	.24	0.22	.053	-0.01	0.86	.15	0.99	.245	-0.80	3.11
MS						.23	0.01	<.001	0.02	0.04	-.01	0.03	.823	-0.07	0.06
SSO											.08	0.27	.180	-0.17	0.89
Age	-.01	0.07	.929	-0.15	0.14	-.12	0.01	.033	-0.04	-0.01	.23	0.04	<.001	0.08	0.24
Gender ^b	-.08	2.01	.156	-6.80	1.10	.05	0.25	.372	-0.03	0.27	.12	1.11	.050	0.01	4.37
GDB	.23	0.60	<.001	1.18	3.52	.10	0.08	.104	-0.27	0.71	.09	0.34	.124	-0.14	1.19
R ²	.063		.001			.104		<.001			.080		.001		
F	4.76					6.56					4.08				

Note. *n* = 288. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour; β = standardized regression

coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit. Analysis conducted using PROCESS model 6.

^a 0 = neutral, 1 = mental abilities (cognitive and socio-emotional). ^b 0 = male, 1 = female

Table 3

Detailed Results of Mediation Analysis Comparing Cognitive and Socio-Emotional Condition for Elephants

Predictor	On Mental similarity					On Self-species overlap					On Conservation support				
	β	SE	p	95% CI		β	SE	p	95% CI		β	SE	p	95% CI	
				LL	UL				LL	UL				LL	UL
Video Type ^a	-.22	1.94	.109	-6.94	0.70	-.31	0.24	.021	-1.03	-0.08	-.01	1.04	.943	-2.14	1.99
MS						.23	0.01	.001	0.01	0.05	-.05	0.04	.474	-0.10	0.05
SSO											.07	0.31	.323	-0.30	0.91
Age	-.04	0.08	.566	-0.22	0.12	-.13	0.01	.061	-0.04	0.01	.26	0.05	<.001	0.08	0.26
Gender ^b	-.08	2.34	.275	-7.19	2.05	.06	0.29	.425	-0.34	0.80	.12	1.24	.084	-0.27	1.30
GDB	.27	0.72	<.001	1.39	4.22	.11	0.09	.105	-0.03	0.33	.09	0.40	.194	-0.30	4.61
R ²	.083		.002			.129		<.001			.092		.004		
F	4.46					5.79					3.28				

Note. *n* = 201. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour; β = standardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit. Analysis conducted using PROCESS model 6.

^a 0 = socio-emotional, 1 = cognitive. ^b 0 = male, 1 = female

Table 4

Detailed Results of Mediation Analysis Comparing Mental Ability Conditions and Neutral Condition for Corvids

Predictor	On Mental similarity					On Self-species overlap					On Conservation support				
	β	SE	p	95% CI		β	SE	p	95% CI		β	SE	p	95% CI	
				LL	UL				LL	UL				LL	UL
Video Type ^a	.22	2.26	.078	-0.46	8.44	.11	0.20	.318	-0.19	0.59	-.04	0.92	.739	-2.12	1.51
MS						.46	0.01	<.001	0.03	0.06	.06	0.03	.406	-0.03	0.08
SSO											.23	0.28	.001	0.39	1.48
Age	-.07	0.09	.232	-0.30	0.07	-.14	0.01	.011	-0.04	-0.01	.07	0.04	.260	-0.03	0.12
Gender ^b	-.03	2.54	.587	-6.38	3.62	-.01	0.22	.793	-0.49	0.38	.03	1.03	.643	-1.55	2.50
GDB	.19	0.75	.001	0.98	3.95	.01	0.07	.819	-0.12	0.15	-.05	0.31	.436	-0.85	0.37
R ²	.049		.007			.242		<.001			.063		.005		
F	3.62					18.03					3.16				

Note. $n = 288$. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour; β = standardized regression

coefficient; CI = confidence interval; LL = lower limit; UL = upper limit. Analysis conducted using PROCESS model 6.

^a 0 = neutral, 1 = mental abilities (cognitive and socio-emotional). ^b 0 = male, 1 = female

Table 5

Detailed Results of Mediation Analysis Comparing Cognitive and Socio-Emotional Condition for Corvids

Predictor	On Mental similarity					On Self-species overlap					On Conservation support				
	β	SE	p	95% CI		β	SE	p	95% CI		β	SE	p	95% CI	
				LL	UL				LL	UL				LL	UL
Video Type ^a	-.12	2.48	.394	-7.01	2.77	-.09	0.22	.457	-0.60	0.27	-.27	0.90	.052	-3.53	0.02
MS						.44	0.01	<.001	0.03	0.06	.09	0.03	.255	-0.02	0.09
SSO											.24	0.29	.003	0.31	1.45
Age	-.11	0.11	.123	-0.38	0.05	-.13	0.01	.042	-0.04	-0.01	.03	0.04	.650	-0.06	0.10
Gender ^b	-.05	3.00	.487	-8.00	3.83	.01	0.27	.933	-0.51	0.55	.03	1.08	.621	-0.78	0.56
GDB	.18	0.92	.012	0.51	4.14	.06	0.08	.362	-0.09	0.24	-.02	0.34	.744	-1.60	2.67
R ²	.203		.080			.237		<.001			.105		.001		
F	2.12					12.10					3.77				

Note. *n* = 201. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour; β = standardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit. Analysis conducted using PROCESS model 6.

^a 0 = socio-emotional, 1 = cognitive. ^b 0 = male, 1 = female

Exploratory Research

As mentioned in the Method part, participants in the gender-diverse group were excluded from the mediation analysis due to methodological issues with the bootstrapping procedure resulting in a reduced sample size with $n = 288$ and $n = 201$, respectively. In order to examine possible consequences of these exclusions, mediation analysis was performed for all four models without covariates but with the full sample of $n = 296$ and $n = 207$, respectively, as part of an exploratory research. Results indicate no differences in significance in all models with one exception. A comparison of the general mental ability conditions and the neutral condition for corvids revealed a marginally significant total indirect effect ($B = 0.45$, $SE = 0.25$, 95% CI [0.003, 0.986]), but no total effect ($B = 0.26$, $SE = 0.92$, $p = .776$) or direct effect ($B = -0.19$, $SE = 0.90$, $p = .833$). Implications are addressed in the discussion.

Discussion

The present study set out to examine whether highlighting different types of animal abilities in short video clips can influence people's perceptions of the respected animals and support for their conservation. Specifically, it examined whether presenting cognitive versus socio-emotional abilities of elephants and corvids increases perceived mental similarity, strengthens self-species overlap, and enhances conservation support.

Species Differences: Elephants Outperform Corvids

Overall, elephants were generally perceived as more similar to humans than corvids across all conditions and analyses. Participants reported feeling a greater sense of connection towards elephants and were more inclined to donate for their conservation in comparison to corvids which can be partly attributed to the taxonomic bias. Mammals, such as elephants, that are taxonomically closer to humans are perceived as more similar and receive a greater amount of monetary donations (Hills, 1995; Lundberg et al., 2019). More precisely, elephants are particularly

favoured as a study by Batt (2009) suggests where they were ranked highest among 40 species in terms of preference. To my knowledge, no study has directly compared attitudes towards elephants and corvids and only a few studies directly compare attitudes towards mammals and birds in general. Callahan et al. (2021) found that participants ranked mammals as having significantly higher cognitive and emotive traits in comparison to birds. Moreover, an analysis of viewing preferences in South African national parks revealed that non-African visitors reported a significantly higher value on observing mammal diversity, including elephants, as compared to bird diversity (Lindsey et al., 2007). Although the difference between the species was not a particular focus of the study, the clear distinction highlights the importance of examining and comparing both species in further research.

Effect of Highlighting Socio-Emotional Animal Abilities

The predominant objective of the present study was to investigate the effects of highlighting different mental abilities of animals, namely cognitive and socio-emotional abilities. The descriptive results suggest that socio-emotional videos in particular elicited an increase in perceived mental similarity, self-species overlap, and conservation support. The results of the analysis further indicate that watching videos that highlight the socio-emotional abilities of animals increases people's connection to them, compared to watching neutral videos, which partly confirms H2. Further, the results suggest a direct-only mediation (Zhao et al., 2010) whereby participants donated on average two more lottery tickets to conservation for corvids after emphasising their socio-emotional abilities rather than their cognitive abilities, even after adjusting for mediators and covariates. These results partly confirm H3, though the findings cannot be extended to elephants. As mentioned in the introduction, Gray et al. (2012) propose that animals can be classified by humans as either moral agents or moral patients. The latter are portrayed as

innocent beings in need of protection from harm. Highlighting the socio-emotional abilities of corvids may allude to their status as moral patients, thereby emphasising their need for help and increasing conservation support. Conversely, cognitive abilities could be associated with a higher level of agency. Consequently, participants may feel less inclined to help these animals as they believe that corvids can help themselves due to their cognitive abilities. Similarly, highlighting the socio-emotional abilities of corvids could lead to an increase in perceived warmth, which is associated with greater support for conservation efforts (Neves et al., 2022; Sevillano & Fiske, 2019). These considerations aim to explain the underlying mechanisms of the effects of emphasising the socio-emotional abilities of animals. However, these explanations must be interpreted with caution, since most analyses did not reveal any significant associations. Furthermore, the results of the study do not support H1, as mental similarity was not significantly affected by the type of video.

Mental Similarity Predicts Self-Species Overlap

Although the presentation of animal videos did not directly influence mental similarity, it was a predictor of self-species overlap across all mediation models and regression analyses. Participants who perceived an animal as being more similar to themselves mentally also reported feeling more connected to it. While this association seems plausible, it has important implications. Whereas the concept of mental similarity examines the actual abilities of animals, self-species overlap refers more to a subjective feeling of connection towards a specific animal. As the association between the two variables suggests, highlighting or even increasing the objective mental abilities of animals can change people's feelings towards them. Furthermore, an increase in connection can result in behavioural change, as indicated by the significant association between self-species overlap and conservation support for corvids in the present study.

Evidence for Mediation Hypothesis

Despite the identification of these associations among the variables, no overall serial mediation was found across the four models in their entirety. H4 and H5 could therefore not be supported. Exploratory research indicated a very weak indirect mediation effect when comparing the ability conditions with the neutral condition for corvids, suggesting an indirect-only mediation in this specific case (Zhao et al., 2010). Nevertheless, the type of video proved to be an inadequate predictor of mental similarity, thus indicating that the effect was of limited strength. Moreover, the effect was attenuated after adjusting for age, gender and general donation behaviour as well as excluding participants who identified as gender-diverse. Consequently, these findings should be interpreted with caution and generally suggest that mental similarity and self-species overlap may not serve as robust and strong mediators under these specific circumstances.

Current research explores other variables that may potentially mediate the relationship between increasing mental similarity and increased conservation support. As postulated by Nijssen et al. (2024), moral concern may act as an important mediator, a theory which aligns with the considerations put forward by Gray et al. (2012). A different yet important possible mediator could also be empathy. The question arises as to whether empathy can be considered as representing the same construct as self-species overlap. However, the present study argues that empathy is more closely associated with emotional responses, whereas self-species overlap encompasses a multitude of factors that determine the experienced connection with other species. Generally humans are more empathic towards species that are more similar to us and empathy is positively associated with belief in animal mind (Hills, 1995; Miralles et al., 2019). Furthermore, a recent study by Ienna et al. (2022) examined the relationship between general empathy and pro-environmental behaviour. Their findings indicate that the affective components of empathy demonstrate a positive association with conservation attitudes. In contrast, cognitive

empathy has been identified as a predictor of actual conservation behaviour. Additionally, empathic individuals have been shown to donate more to animal conservation than to other charities (Bennett, 2003). Empathy, being associated with both mental similarity and conservation support, could therefore be a possible mediator variable. In a review including a total of 25 studies, Williams et al. (2021) analysed the relationship between mental similarity, pro-environmental behaviour and its mediators. Empathy was found to be a mediator between the two variables, also with regard to animals. A study by Yue et al. (2021) found that a tendency to anthropomorphise animals was linked to greater empathy, which, in turn, resulted in reduced consumption of animal products and increased conservation intentions. These considerations underscore the potential of empathy as a mediating variable and strengthen the importance of directing future research towards the enhancement of empathy.

Effects of Age and Gender

The present study found that donations for elephant conservation increased with age, which is consistent with previous research that demonstrated a general increase in the amount of donations to charity up to retirement age (Schlegelmilch et al., 1997). As age and income are highly correlated in the same way (Ozhamaratli et al., 2022), it is probable that the increase in donations is attributable to the greater financial resources of older participants. However, more recent research indicated that the relationship between support for biodiversity conservation and income is not as straightforward as previously assumed (Veríssimo et al., 2018). Instead, the evidence suggests a more nuanced and case-specific relationship, emphasising the need for a deeper examination of the underlying demographic factors that influence biodiversity conservation. Additionally, Martín-López et al. (2007) show that younger people are more willing to donate for conservation support as they are more concerned with biodiversity conservation in general. This finding could also provide a theoretical explanation for the results of the present study, which

demonstrated that younger individuals exhibited increased self-species overlap. Similarly, younger people rate animal mind as greater (Kupsala et al., 2016), which in turn is positively related to self-species overlap. Nonetheless, in the present study age was not associated with mental similarity. The present study employed a measure of self-species overlap that is closely related to the Inclusion of Nature in the Self scale by Aron et al. (1992), which is generally used to assess nature connectedness. Interestingly, a decline in nature connectedness has been observed among adolescents, reaching a plateau at the age of 25 (Hughes et al., 2019; Richardson et al., 2019). The present findings demonstrate a divergence from the expected outcomes as older people should exhibit an increased degree of self-species overlap. In total, the relationship between age, conservation support and self-species appears to be inconsistent and dependent on context and sample. The present sample was also characterised by a notable youthfulness, with almost 80% of participants between the ages of 18 and 27 allowing only partially for representative age comparisons.

The present study found no evidence that gender was associated with any of the variables in question. This is in contrast to the findings of previous research, which indicated that women tend to donate more to charity than men (Schlegelmilch et al., 1997). However, the sample was distributed unevenly with noticeable more female participants, likely limiting generalizability of the results. With regard to the analysis of gender-diverse participants, the descriptives indicated the highest values for mental similarity, self-species overlap and conservation support within this group. However, the findings do not demonstrate statistical significance, primarily due to the limited group size and substantial within-group variability. Furthermore, due to statistical constraints, participants who identified as gender-diverse were excluded from the main analysis, thereby limiting the generalizability of the findings. Future studies should aim to recruit larger and more diverse samples to enable meaningful analysis of gender beyond binary categories.

Limitations and Further Research

Increasing conservation support through the accentuation of particular mental animal abilities has been demonstrated to be effective for corvids, but not for elephants, in the present study. Due to elevated mean values observed across all variables for elephants this may be attributable to a ceiling effect. The presence of pre-existing positive attitudes towards elephants may have overshadowed the impact of the intervention, resulting in the absence of significant effects. For corvids, pre-existing attitudes might have been more neutral or even negative, and therefore more susceptible to modification. However, these considerations are speculative in nature, as pre-existing attitudes towards species were not collected in the survey. Future research should therefore encompass the measurement of baseline levels and the integration of longitudinal follow-up measurements in order to establish causal relationships. With a focus on lesser-known species, multiple species should be analysed and compared, as effective interventions may be more species-specific than is currently realised.

Furthermore, the videos employed in the study were not necessarily comparable and exhibited significant variations across multiple dimensions. For instance, the video of corvids highlighting socio-emotional abilities thematized group cohesion, while the corresponding elephant video concentrated more on the mother-child relationship. Furthermore, the videos exhibited the species in different environments: one being in the wild, and the other being in captivity. It is possible that this difference in environment may also influence the viewer's perception of the animals. However, a manipulation check ensured that participants understood the videos in the intended way; if not, they were excluded from the analysis. A further limitation of the study is that the intervention was rather brief, especially in comparison to other studies examining the effects of animal videos (Barbas et al., 2009; Pearson et al., 2013). It is therefore recommended that future research concentrates on the identification of efficacious interventions,

while maintaining a balance between the duration of the intervention and its effectiveness. In view of the results indicating the influence of demographic variables on outcome variables, these should be integrated into future analyses.

Conclusion

The present study contributes to the existing body of literature on the subject of conservation research by integrating the prevailing differentiation between socio-emotional and cognitive abilities of animals. In specific circumstances, a concise video intervention that emphasises the socio-emotional abilities of corvids can effectively modify not only attitudes towards conservation but also behaviour in terms of active donations. However, further research is required to identify effective interventions that target species-specific behavioural change, in order to effectively address the biodiversity crisis.

Transparency Statement

While I am grateful for the guidance and feedback received during the preparation of this thesis, I affirm that I am solely responsible for the ideas, analyses, and conclusions contained within this work, and any errors or omissions remain entirely my responsibility. To provide a fully transparent view of the writing process, this section also describes what additional tools were used and how they were used. The tool DeepL Write (<https://www.deepl.com/de/write>) was used for language editing and rephrasing sentences in a more academic manner. ChatGPT (<https://chat.openai.com/>) was used for idea generation, feedback on statistical interpretation and text revision. The tool was used in a supportive way without generating content for empirical or statistical parts. References created by ChatGPT were not included in the paper. The collection and analysis of data was conducted in collaboration with a fellow student. Content, writing, and interpretation presented in this thesis, however, were done individually.

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Appendix A

Materials

Table A1

Mental Similarity Scale

Item
Subscale Experience
1. sich hungrig fühlen
2. Furcht erleben
3. Schmerz empfinden
4. Vergnügen empfinden
5. Zorn empfinden
6. Verlangen empfinden
7. eine Persönlichkeit haben
8. bei Bewusstsein sein
9. stolz sein
10. sich verlegen fühlen
11. Freude empfinden
Subscale agency
12. seine eigenen Handlungen kontrollieren
13. moralische Entscheidungen treffen
14. Erinnerungen haben
15. Emotionen erkennen
16. Handlungen planen
17. mit anderen kommunizieren
18. denken

Figure A1*Measurement of Self-Species Overlap*

Wählen Sie bitte das Bild aus, das Ihre Verbundenheit mit dem Tier im Video am besten beschreibt.

(„Selbst“ = Sie; „Tier“ = entsprechendes Tier).

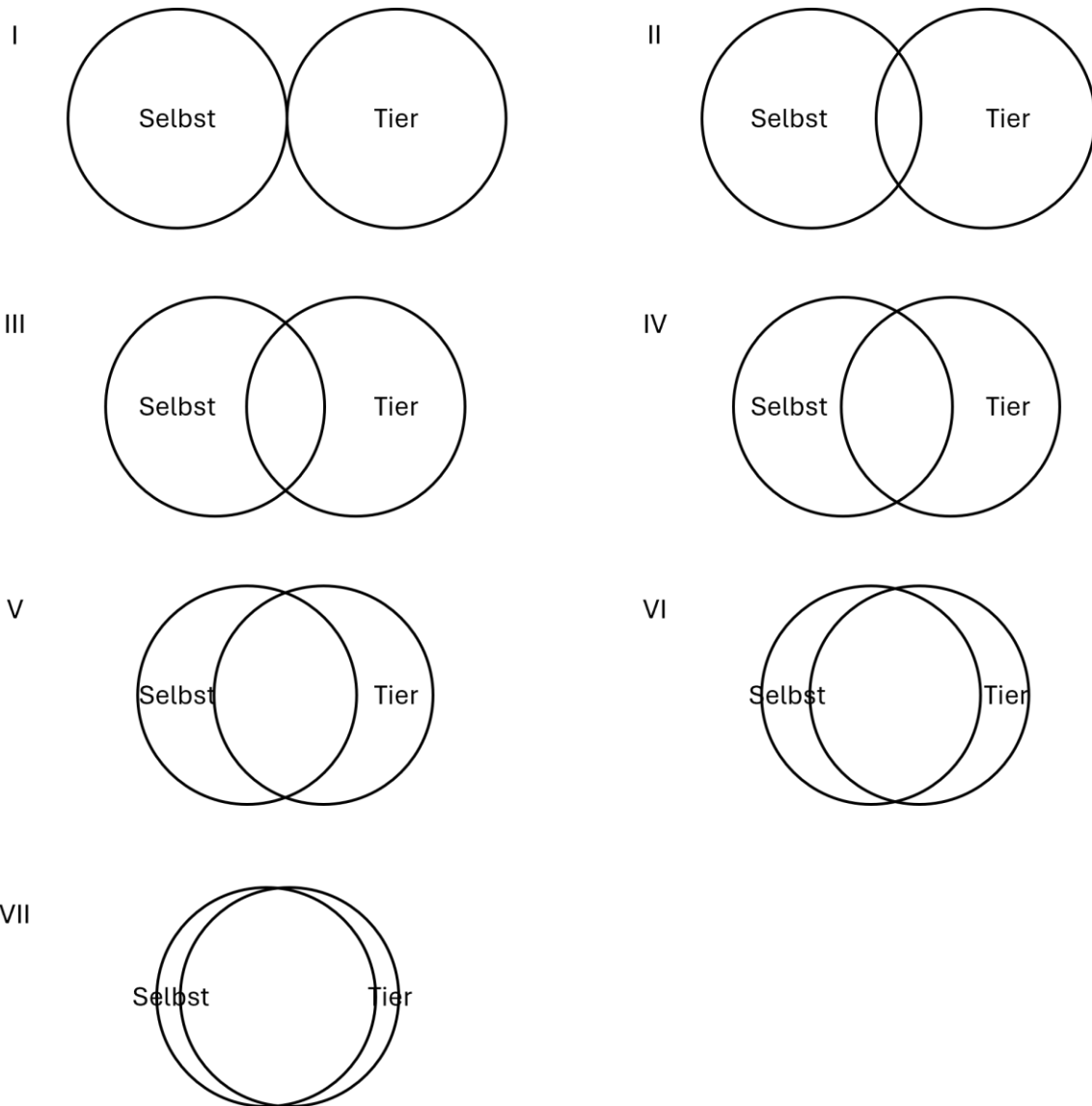


Figure A2*Instructions for Measurement of Conservation Support*

Bevor wir die Studie beenden, haben wir eine Frage an Sie. Die beiden Tierarten, die Sie heute gesehen haben, sind gefährdet. Sie sind aufgrund des Klimawandels, der unethischen Behandlung oder der Zerstörung ihrer Lebensräume zunehmend vom Aussterben bedroht. Wie bereits genannt, erhalten Sie als Dank für Ihre Teilnahme 30 digitale Lotterie-Tickets! Damit haben Sie die Chance, 30€ zu gewinnen. Sie können alternativ auch einige oder alle Ihre Lotterie-Tickets an eine internationale Nichtregierungsorganisation spenden, die sich für den Schutz von gefährdeten Tier- und Pflanzenarten einsetzt. Die Organisation hat engagierte Projekte, die sich spezifisch für den Schutz der heute gesehenen Tierarten einsetzen. Sie können also speziell für die beiden Tierarten spenden. Wenn das Gewinner-Lotterie-Ticket unter Ihren gespendeten Tickets ist, werden die 30€ an das spezielle Projekt gespendet. Das bedeutet: je mehr Teilnehmende ihre Tickets spenden, desto wahrscheinlicher ist es, dass das Geld für den Schutz und den Erhalt dieser Art verwendet wird. Gewinnt ein nicht-gespendetes Lotterie-Ticket, erhält die entsprechende teilnehmende Person den Gewinn. Wir möchten darauf hinweisen, dass dies keine hypothetische Frage ist: Die Tickets, die Sie spenden möchten, werden wirklich Teil der Lotterie sein und das Geld wird wirklich für ein Projekt gespendet. Sind Sie bereit, einige oder alle Ihrer 30 Lotterie-Tickets an eine Organisation zu spenden? Bitte geben Sie an, wie viele Tickets Sie spenden möchten und wie viele Sie für sich behalten werden. (HINWEIS: Die Gesamtsumme sollte 30 betragen, andernfalls werden Sie nicht zur nächsten Seite weitergeleitet.)

Appendix B

Detailed Results of Analyses

Table B1

Descriptives of Covariates Separated by Main Variables

	Overall		Mental similarity		Self-species overlap		Conservation support	
	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age								
23 or younger	142	47.97	75.16	14.68	3.57	1.63	11.43	5.24
24 or older	154	52.03	74.32	15.80	3.10	1.61	12.15	5.07
Gender								
Male	63	21.28	75.69	15.35	3.22	1.75	10.98	5.91
Female	225	76.01	74.22	15.28	3.33	1.58	12.01	4.94
Diverse	8	2.70	81.20	13.64	4.06	2.26	12.31	4.91
GDB								
Never	144	48.65	72.36	14.40	3.17	1.62	11.30	5.52
1 to 6 times	112	37.84	75.44	16.54	3.33	1.63	12.17	4.61
More than 6 times	40	13.51	81.19	12.48	3.89	1.63	12.59	5.21

Note. GDB = General donation behaviour. Values for main variables were collapsed for both animals as in the mediation analysis.

Age groups were collapsed into two groups with equal *n* to facilitate comparison of variables; GDB categories were collapsed due to low number of cases in middle categories.

Table B2

Blockwise Regression on Conservation Support Comparing Mental Ability Conditions and Neutral Condition for Elephants

	Block 1			Block 2			Block 3			Block 4		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Video Type ^a	.07	0.99	.834	.07	1.00	.244	.06	1.00	.313	.07	0.98	.208
MS				.03	0.03	.579	.01	0.03	.861	-.01	0.03	.847
SSO							.08	0.27	.174	.10	0.26	.110
Age										.22	0.04	<.001
Gender ^b												
female										.12	1.10	.052
diverse										.02	2.87	.714
GDB										.09	0.33	.112
R^2 / R^2 adjusted	.005/.002		.224	.006/-.001		.579	.111/.012		.174	.282/.080		<.001

Note. $n = 296$. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour. β = standardized regression coefficients. Outcome is conservation support for elephants.

^a 0 = neutral, 1 = mental abilities (cognitive and socio-emotional). ^breference category = male

Table B3

Blockwise Regression on Conservation Support Comparing Cognitive and Socio-Emotional Condition for Elephants

	Block 1			Block 2			Block 3			Block 4		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Video Type ^a	-.02	1.03	.834	-.02	1.04	.829	-.01	1.05	.942	-.01	1.02	.902
MS				-.01	0.04	.934	-.03	0.04	.725	-.05	0.04	.482
SSO							.07	0.30	.333	.09	0.30	.225
Age										.26	0.05	<.001
Gender ^b												
female										.13	1.23	.086
diverse										.05	3.14	.464
GDB										.10	0.39	.164
R^2 / R^2 adjusted	<.001/-.005		.834	<.001/-.010		.934	.005/-.010		.333	.093/.061		<.001

Note. $n = 207$. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour. β = standardized regression coefficients. Outcome is conservation support for elephants.

^a 0 = socio-emotional, 1 = cognitive. ^breference category = male

Table B4

Blockwise Regression on Conservation Support Comparing Mental Ability Conditions and Neutral Condition for Corvids

	Block 1			Block 2			Block 3			Block 4		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Video Type ^a	.02	0.92	.776	.002	0.91	.976	-.01	0.90	.833	-.01	0.91	.837
MS				0.15	0.02	.012	.05	0.03	.447	.06	0.03	.397
SSO							.21	0.27	.001	.22	0.27	<.001
Age										.06	0.04	.302
Gender ^b												
female										.03	1.02	.645
diverse										.02	2.68	.702
GDB										-.05	0.31	.388
R^2 / R^2 adjusted	<.001/.003		.776	.022/.015		.012	.056/.047		.001	.062/.039		.779

Note. $n = 296$. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour. β = standardized regression coefficients. Outcome is conservation support for corvids.

^a 0 = neutral, 1 = mental abilities (cognitive and socio-emotional). ^breference category = male

Table B5

Blockwise Regression on Conservation Support Comparing Cognitive and Socio-Emotional Condition for Corvids

	Block 1			Block 2			Block 3			Block 4		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Video Type ^a	-.16	0.90	.023	-.15	0.89	.030	-.14	0.87	.035	-.14	0.88	.040
MS				.19	0.03	.006	.08	0.03	.268	.09	0.03	.249
SSO							.23	0.27	.003	.23	0.28	.004
Age										.03	0.04	.631
Gender ^b												
female										.04	1.08	.608
diverse										.05	2.77	.446
GDB										-.03	0.33	.633
R^2 / R^2 adjusted	.025/.020		.023	.061/.051		.006	.101/.087		.003	.105/.073		.917

Note. $n = 207$. MS = Mental similarity; SSO = Self-species overlap; GDB = General donation behaviour. β = standardized regression coefficients. Outcome is conservation support for elephants.

^a 0 = socio-emotional, 1 = cognitive. ^breference category = male