

**The Effect of Different Types of Framing on People's  
Perception of Zoos**

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## Abstract

Zoos have been surrounded by controversy ever since people started to value animals as more than entertainment. This controversy has led to a decline in support and acceptance of zoos. As people view zoos as either necessary in educating the public and helping support the conservation of endangered species, or as cruel animal exploiting businesses. This study uses two different types of beliefs, Domination and Mutualism, to explain the possible underlying reasons this controversy arises. In this study, we identify, conceptualize, and empirically assess two alternative hypotheses of the effect different framing types have on people's acceptability of zoos: hedonic framing, biospheric framing, and no framing. A questionnaire was taken to assess people's belief orientations in which a video was shown where one of the framing types was used to measure its influence on their acceptability of zoos. Our results did not show any significant effect of the framing types on the acceptability of zoos. People's beliefs did predict their acceptability of zoos consistently. An indication for an interaction effect suggested that to increase acceptability zoos should not use hedonic framing but should instead aim to reduce conflict between both belief systems. Future research should be done to see if an effect of different types of framing can be found when the information is presented in a real-life situation with real animals.

*Keywords:* zoo controversy, domination beliefs, mutualism beliefs, hedonic framing, biospheric framing

## **The Effect of Different Types of Framing on People's Perception of Zoos**

### **Zoo Controversy, Cruel or Necessary?**

Zoos have been a topic of discussion, debate and controversy for a long time. Opinions differ on the ethics and workings of zoos, for example around the necessity of keeping wild animals locked up for human entertainment. And people disagree on the necessity of the captive breeding programs or argue whether these institutions do more harm than good. People arguing against zoos will mostly tell you that the concept of keeping animals captive purely for our entertainment is a form of animal cruelty and should not be accepted. Or it is argued that wild animals should be left alone and do not belong in zoos, where they would be miserable and not well taken care of (Reade & Warman, 1996). However, people advocating the existence of zoos would tell you that zoos have multiple goals relative to the animal species they house or on the conservational side. The Association of Zoos and Aquariums lists these goals as follows; (1) the care and welfare of the animals they exhibit, (2) educating and engaging the public, professional and government audiences, (3) species and habitat conservation and (4) academic research (Godinez & Fernandez, 2019). When education and research are mentioned as being important functions of zoos, entertainment is mentioned as being the least important aspect (Reade & Warman, 1996). When looking at the roles zoos can play in conservation you can categorize the different aspects into direct wildlife management, research, conservation education, and financial tributes for conservation. Thereby addressing the three major World Zoo Conservation Strategy's initiatives: supporting the conservation of endangered species and their natural ecosystems; offering support and facilities to increase scientific knowledge to benefit conservation; and promoting public and political awareness (Tribe & Booth, 2003). Whatever your viewpoint is regarding this debate,

either as an animal protectionist or as a wildlife conservationist, Keulartz (2015) argues that both parties can find some common ground in the view that zoos can be morally justifiable if the costs to animal welfare and freedom are clearly and heavily outweighed by the benefits of that species' conservation and preservation.

Zoos must face this controversy every day and, if they would like to increase the number of visitors, need to know how to handle the differing opinions about zoos. In this bachelor thesis, the position of zoos is taken into consideration and will be used to try to answer the question: *“How can zoos frame their educational and conservational efforts to gain more support and acceptance?”*

### **Why Would Zoos be Necessary?**

There are several perspectives to be taken on why zoos and aquariums could be necessary. One of the arguments is that interactions with live animals result in higher retention of the given information, the people having a positive emotional experience, having a greater concern for the wild animals and people wanting to get involved with conservation efforts. (Miller et al. 2020). They compared this to the results from a condition where people were given the same information and were shown the same animal but through a video. In the video condition, the effects stated above were not observed. In other research, they found that after visiting a zoo or aquarium the people had increased their understanding of biodiversity. And the researchers observed an increase in understanding of how to identify actions to protect said biodiversity on an individual level (Moss et al., 2015). On top of these findings research found that zoos can increase public interest in endangered animal species, this increased public interest led to more financial support for those endangered species (Fukano et al., 2020) Lastly, because zoos are locations where a lot of social interactions take place,

they can enable the development of an ‘environmental identity’, a self-concept that encourages concern for animals and the natural world (Clayton et al., 2011).

### **Values and Beliefs**

When trying to answer the question of how zoos should frame their conservational and educational efforts to increase acceptance from the public, it helps to differentiate the different viewpoints people have of zoos and where these differing viewpoints stem from. One way to do this is to look at their values and beliefs. Values can affect people’s preferences, convictions and behaviours at the same time and have been considered to be relatively stable over time (de Groot & Steg, 2007). This makes using values especially useful in our research. There are four types of values which can help us explain a person’s opinion about zoos. Those four types of values can be categorised as follows: the cluster of self-enhancement values and the cluster of self-transcendent values (de Groot & Steg, 2007, 2009). The first cluster consists of egoistic values and hedonic values, people with egoistic values will look at things from a cost-benefit analysis regarding personal gain. When looking at pro-environmental behaviour these people will act pro-environmentally if the personal benefits outweigh the personal costs (De Groot & Steg, 2009). People with high hedonic values will look at things from a cost-benefit analysis regarding personal effort or enjoyment. These people will act pro-environmentally when it is the most “fun” or “enjoyable” option. The second cluster of values consists of the altruistic and biospheric values, someone with altruistic values will look at things from a cost-benefit analysis for other people instead of themselves. Meaning that they will act pro-environmentally if it benefits the people around them. People with high biospheric values will look at things with the possible consequences for the environment as a cost-benefit analysis. According to De Groot and Steg (2009), all people hold all four types of values to some extent and these values can all play a role in

acting pro-environmentally or not. If we take these values in the context of people's opinions about zoos, we can argue that people with strong values in the self-enhancement cluster will not be opposed to zoos. Because they would value the fun going to the zoo highly. And people with strong values in the self-transcendent cluster would probably be opposed to zoos because they would feel pity for the animals in the zoo.

Another, more specific way to explain the difference in people's opinions about the ethics of zoos is by using their beliefs about wildlife. By looking at beliefs which are more specific towards the treatment of wildlife and the natural world, we can incorporate people's opinions about zoos better. Because one of the biggest aspects of the controversy around zoos is how the animals are treated (Reade & Warman, 1996). Manfredo et al. (2017) propose the existence of two different, opposing, types of beliefs regarding the treatment of wildlife and the natural world. The first of these beliefs is the Mutualist beliefs or values. People who share these beliefs are of the opinion that we as humans should limit our activities and impact on the natural world. As we share this planet with all the creatures living on it. The other type would be the Domination beliefs or values. When people value domination above mutualism they believe that the natural world and the wildlife inhabiting it exist for human use. Mutualism beliefs are generally viewed as being the more modern, and Domination as the more traditional of the two belief orientations. These beliefs are persistent within individuals and generations over time, although changes do occur. Beliefs change when social conditions change, which takes time (Manfredo et al., 2017). If we take these beliefs in the context of people's opinions about zoos we can argue that people who share mutualist beliefs would be more likely to be against keeping animals in captivity and the people who share the domination beliefs would be more likely to not be opposed to zoos.

To sum up, people's opinions and perceptions of zoos can differ greatly. Some people see zoos as cruel animal exploiting businesses, while others see them as necessary for the

conservation and protection of endangered species and help to educate the public about these issues. To answer the question “*How can zoos frame their educational and conservational efforts to gain more support and acceptance?*” I will be using the framework of beliefs to differentiate between people with strong Mutualism and strong Domination beliefs.

My first hypothesis is that people with strong Mutualist beliefs will be less accepting of zoos than people with strong Domination beliefs. The reasoning behind this hypothesis is that people with strong Mutualist beliefs would be more opposed to keeping animals in captivity for our entertainment. People with strong Domination beliefs will not be opposed to zoos in the first place, since they view animals as existing for human use (Manfredo et al., 2017).

Secondly, I hypothesize that the acceptability of zoos will show a greater increase in people with strong Mutualist beliefs when the zoo’s conservational and educational efforts are made more salient compared to someone who scores higher on Domination beliefs. The reasoning behind this hypothesis stems from the overlap between the self-transcendent value cluster and Mutualism beliefs, both centre around benefiting others and the environment (de Groot & Steg, 2007, 2009; Manfredo et al., 2017). So, when making the conservational and educational efforts more salient, the zoo creates an image for themselves which is more in line with the beliefs of Mutualists. Which results in more acceptability of zoos.

## **Methods**

### **Participants**

The participants were recruited via the researchers’ networks and convenience sampling. There was no compensation for participation. In total 567 participants were recruited, 150 participants were excluded because they were either too young, did not pass

both the manipulation and attention checks, or did not finish the survey. This left 426 valid participants from 32 different countries, mostly Europeans, for further analysis (see Appendix B). In total 171 participants were male, 245 were female and 8 were non-binary/other, with a mean age of 39 years ( $SD = 31.88$ ). The participants were required to either speak English, Dutch or German.

## **Design and Procedure**

For this experiment, we used an online questionnaire made with Qualtrics XM. This questionnaire consisted of demographic measures (age, gender, nationality) and questions measuring their beliefs. Next, the participants were randomly shown one of three video conditions, in which they saw footage of Amur tigers (*Panthera tigris altaica*) playing in the snow accompanied by text including facts. The video conditions were split into two distinct types of framing; hedonic and biospheric framing. Where the biospheric framing condition served as framing the conservational and educational efforts the zoo makes. Within these types of framing the facts shown consisted of two types of information; information about tigers in general and information about zoos. Each video had five facts about the tigers themselves and five facts about the zoos. For example, *“Tigers can roar but not purr”* or *“This zoo donates to the International Union for Conservation of Nature tiger protection program, which has increased tiger populations on project sites by 40%”*. The last condition was the control condition and was only shown the raw footage. After watching one of the videos the participants were asked to continue the questionnaire, where we measured their opinions about zoos. The experiment took about twenty minutes to complete. Our independent variables were the participant’s dominant beliefs, and our dependent variables were the scores on the Acceptability of Zoos and Zoo Approval scales.



## Measurement Instruments

A measure of their Belief Orientation (Manfredo et al., 2009) was taken where respondents rated their level of agreement with an item on a scale ranging from 1 = “*strongly disagree*” to 7 = “*strongly agree*”. Mean scores were computed for Domination Beliefs ( $M = 3.6$ ,  $SD = 0.8$ ,  $\alpha = .79$ ) and Mutualism Beliefs ( $M = 4.4$ ,  $SD = 1.2$ ,  $\alpha = .87$ ). In the analysis, the participants were split into two groups, one group scoring higher on Domination and one group scoring higher on Mutualism. This was done by subtracting the mean score on Domination from the mean score on Mutualism. If the value was greater than 0, they would be classed as Mutualist and if the value was less than 0, they would be classed as Domination oriented. We also included some questions about zoos namely; a measure for Zoo approval (Miller, 2011), where respondents rated their level of agreement with an item on a scale ranging from 1 = “*strongly disagree*” to 7 = “*strongly agree*” ( $M = 3.6$ ,  $SD = 1.0$ ,  $\alpha = .83$ ). Next a measure of the Acceptability of Zoos, which is derived from an article by Liu et al., (2019). Where we asked participants to what extent, on four 7-point scales (ranging from -3 to 3), they thought the zoos were: very unacceptable to very acceptable, very bad to very good, very negative to very positive, and very unnecessary to very necessary ( $M = 4.1$ ,  $SD = 1.8$ ,  $\alpha = .82$ ). Both these scales were used because each scale covers a different aspect of the controversy surrounding zoos. The Zoo Approval scale focuses more on the treatment of animals and the Acceptability of Zoos scale focuses more on the acceptability and necessity of zoos.

## Results

### Hypothesis one

To test if people with strong Mutualist beliefs would be less accepting of zoos than people with strong Domination beliefs, a Mann-Whitney U test was run to determine if there were differences in the Acceptability of Zoos score between people with stronger Domination or Mutualism Beliefs. Mann-Whitney u test was used because the data was not normally distributed. Distributions of the Acceptability of Zoos scores for both groups were similar, as assessed by visual inspection of the histogram (see Appendix B). Acceptability of Zoos score was significantly higher in people with Domination Beliefs ( $Mdn = 4.88$ ) than in people with Mutualism Beliefs ( $Mdn = 4.25$ ),  $U = 7757.5$ ,  $z = -3.157$ ,  $p = .002$ . Another Mann-Whitney U test was run to determine if there were differences in Zoo Approval scores between people with Domination or Mutualism Beliefs. Distributions of the Zoo Approval scores for both groups were similar, as assessed by visual inspection of the histogram (see Appendix B). Zoo Approval score was significantly higher in people with Domination Beliefs ( $Mdn = 3.875$ ) than in people with Mutualism beliefs ( $Mdn = 3.563$ ),  $U = 8294.0$ ,  $z = -2.398$ ,  $p = .016$ . Meaning that people with strong Domination beliefs score higher on both Acceptability of Zoos and Zoo Approval compared to people with strong Mutualism beliefs.

### Hypothesis two

#### *Acceptability of Zoos analysis*

Our second hypothesis expected that the Acceptability of Zoos will increase in people with strong Mutualist beliefs when the zoo's conservational and educational efforts are made more salient compared to someone who scores higher on Domination beliefs. A two-way

ANOVA was conducted to examine the effects of Beliefs (*Mutualism, Domination*) and the different experimental Conditions (*Hedonic, Biospheric, Control*) on the Acceptability of Zoos score. Residual analysis was performed to test for the assumptions of the two-way ANOVA. Outliers were assessed by inspection of a boxplot. There were 5 outliers, none of the outliers were assessed as being greater than 3 interquartile ranges from the edge of the box in their respective boxplot. None were excluded from the analysis. After inspection of the histogram plots, the residuals were assessed as following a normal distribution. After visual inspection of the scatterplots, the assumption of homogeneity of variances was supported (see Appendix B).

The interaction effect between the different experimental Conditions and people's Beliefs was not statistically significant,  $F(2, 296) = 1.444, p = .238, \text{partial } \eta^2 = .010$ . After inspecting the profile plots, an indication of an interaction effect was found. So simple main effects were also calculated (see figure 1). The simple main effect of the different conditions on participants with strong Mutualism Beliefs on the Acceptability of Zoos score was not statistically significant,  $F(2, 296) = 2.009, p = .136, \text{partial } \eta^2 = .013$ . The simple main effect of the different conditions on participants with strong Domination Beliefs on the Acceptability of Zoos score was not statistically significant.  $F(2, 296) = .292, p = .747, \text{partial } \eta^2 = .002$ . Therefore, our experimental conditions did not influence participants' Acceptability of Zoos.

To see if the experimental conditions combined with a participant's beliefs had a significant effect on their Acceptability of Zoos score, we compared the means for both beliefs over the different conditions. There were no statistically significant effects from peoples' Beliefs on their Acceptability of Zoos scores for participants in either the Control or Biospheric conditions,  $p = .082$  and  $p = .414$  respectively. Meaning that biospheric framing

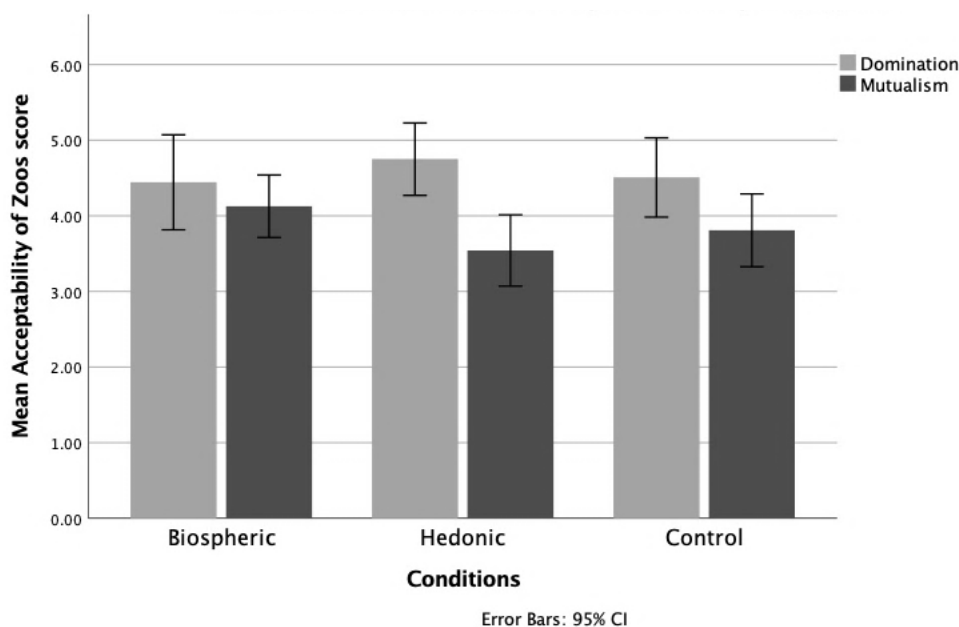
or no framing at all did not affect participants' Acceptability of Zoos scores, regardless of their belief orientation. But there was a statistically significant effect in mean Acceptability of Zoos scores between people in the Hedonic condition depending on their Beliefs  $F(1, 296) = 11.322, p < .001, \text{partial } \eta^2 = .037$ . Meaning that hedonically framed information did affect participants' Acceptability of Zoos, depending on whether a person is more Mutualistic or Domination oriented.

The participants with strong Domination Beliefs in the Hedonic Condition had a mean Acceptability of Zoos score that was 1.208 points, 95% CI [.501, 1.914] higher than people with strong Mutualism Beliefs in the Hedonic condition, a statistically significant difference,  $p < .001$ . This tells us that when the hedonic parts of going to the zoo are made salient the people with strong Domination beliefs show significantly more acceptability of zoos than people with strong Mutualism beliefs.

To compare the groups an analysis of the main effects was done. There was no statistically significant main effect of Conditions on Acceptability of Zoos score,  $F(2, 296) = .164, p = .849, \text{partial } \eta^2 = .001$ . Again, indicating the experimental conditions did not influence a person's Acceptability of Zoos score. There was a statistically significant main effect of Beliefs on Acceptability of Zoos score,  $F(1, 296) = 11.254, p < .001, \text{partial } \eta^2 = .037$ . This shows that the difference in the Acceptability of Zoos score is able to be explained by looking at a person's beliefs.

**Figure 1**

*Mean of Acceptability of Zoos Across the Different Groups*



### ***Zoo Approval analysis***

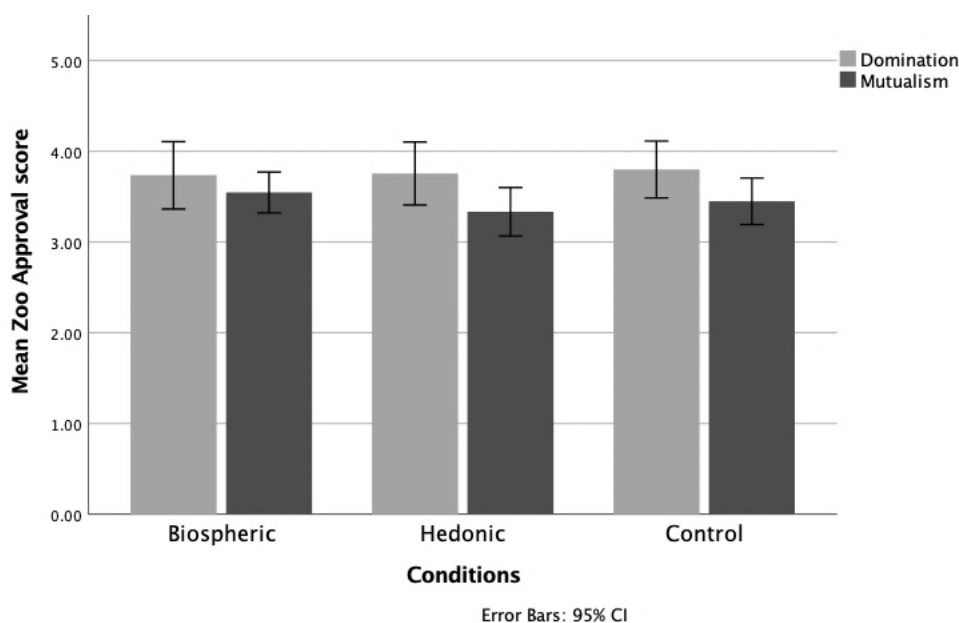
To test whether Zoo Approval will increase in people with strong Mutualism beliefs when the zoo's conservational and educational efforts are made more salient compared to someone who scores higher on Domination beliefs, a two-way ANOVA was conducted. Assumption checks were conducted as above, there were no outliers, residuals were normally distributed as assessed by histogram plots by visual inspection and there was homogeneity of variances as assessed by scatterplots plotting residuals and studentized residuals against the predicted value of Zoo Approval (see Appendix B).

The interaction effect between the Conditions (*Hedonic*, *Biospheric*, *Control*) and people's Beliefs (*Mutualism*, *Domination*) was not statistically significant,  $F(2, 296) = .303$ ,  $p = .739$ , partial  $\eta^2 = .002$ . Therefore, an analysis of the main effect was performed. There was no statistically significant main effect of Conditions on Zoo Approval score,  $F(2, 296) = .234$ ,

$p = .791$ , partial  $\eta^2 = .002$ . Meaning that our manipulation did not affect peoples' Zoo Approval scores. There was a statistically significant main effect of Beliefs on Zoo Approval score,  $F(1, 296) = 6.368$ ,  $p = .012$ , partial  $\eta^2 = .021$ . This indicates that the difference in Zoo Approval scores is able to be explained by looking at a person's beliefs.

**Figure 2**

*Mean of Zoo Approval Across the Different Groups*



## Discussion

In this bachelor thesis, I aimed to investigate how zoos can frame their educational or conservational efforts, in order to gain more acceptance from the public. To answer this question, we looked at different framing options with regard to people's beliefs. These framing options consisted of a biospheric condition - where the conservational and educational benefits of the zoo were made prominent - and a hedonic framing condition - where we accentuated the fun aspects of going to the zoo. We differentiated between two distinct types of beliefs; Domination and Mutualism beliefs. Or in other terms, whether people

think animals can be used for human entertainment, or whether people think animals should be treated as equals. First, I hypothesised that people with strong Domination beliefs would be more accepting of zoos, compared to people with strong Mutualism beliefs. The findings of this study show that the first hypothesis is supported. I also hypothesised that the acceptability of zoos would increase in people with Mutualism beliefs when zoos made their educational and conservational efforts more salient. This second hypothesis was not supported by this study, as there were no significant differences in the acceptability of zoos when looking at the different types of framing. Although when looking at the profile plots for the mean scores on Acceptability on Zoos, spread over the different conditions and beliefs, there was some indication of a negative effect on zoo acceptance for people with strong Mutualism beliefs when the information about the zoo was hedonically framed.

When looking at the theoretical framework for beliefs the findings for the first hypothesis are consistent with similar findings. In a study by Manfredi et al. (2020) people with strong Mutualism beliefs were opposed to the traditional management practices, in this case killing grey wolves who prey on livestock. Whereas the people with strong Domination beliefs were not. Comparable results were found in a study by Manfredi et al. (2009) where they found that people with a mutualism orientation were less supportive of forms of management or individual behaviours that result in death or harm to wildlife. Putting this in the framework of our study; Someone with strong Mutualism beliefs would not be supportive of the traditional practice of keeping animals in captivity for entertainment purposes. Because people with strong Mutualism beliefs tend to anthropomorphise them, which would result in compassion for the animals (Manfredi et al., 2020). Whereas people with strong Domination values, who believe that wildlife should be used to benefit humans, wouldn't care if the animals are being held in captivity.

Regarding the second hypothesis, one reason why the educational or conservational framing for the work of the zoo did not have a significant effect on the acceptability of zoos, for people with strong Mutualism beliefs, could be that such beliefs are remarkably persistent within individuals (Manfredo et al., 2020). This raises the question of whether it is possible to influence peoples' opinions or beliefs with information alone. This is called information provision. According to Steg and Berg (2019), it is possible to influence people with information provision, but it is not the most effective way to influence people's beliefs. A more effective strategy is information provision with tailored information. Tailored information is designed to reach a group of people based on their unique characteristics (Steg & Berg, 2019). We tried to use this type of information provision in our experiment, but still no significant effect was found. This could mean that either the manipulation we used was not tailored enough to our participants' characteristics, or that the manipulation needed more time to influence our participants' opinions.

The small difference in the effect the hedonic framing had on people with strong Mutualism beliefs, compared to people with strong Domination beliefs, is something worth looking into a bit more. One way to possibly explain this difference is by looking through the framework of the different beliefs. The hedonically framed information about the zoo is very much in line with the beliefs people with high scores on Domination have about the animals in zoos. So, making the hedonic aspects of going to the zoo more salient could increase their acceptance of zoos or maybe even excite them to go to the zoo. And when someone with strong mutualism beliefs is presented with hedonically framed information about a zoo, they would be even more aversive to zoos. Because said information only strengthens the image of zoos being just for human entertainment only. Which is in direct conflict with their beliefs on how animals should be treated.



When comparing these results to similar studies done in this field, the findings made by Reade and Waran (1996) are replicated, people value the entertainment side of zoos the least. Or to put it in perspective of our study, the hedonic framing option covered the entertainment side of zoos. On top of that, this study showed that participants were more averse to zoos when the entertainment side of zoos is highlighted. If we want to promote the behaviour of supporting the zoos. A comparison can be made between the results found in this study and a similar study looking at promoting certain behaviour, in the case of that study pro-environmental behaviour, using people's values (Groot and Steg, 2009). Where they found that to promote stable pro-environmental behaviour, you should aim to lower 'competition' between biospheric, altruistic and egoistic values. According to the cognitive hierarchy framework, people's values are immediate antecedents of their beliefs or value orientations (Steg & Berg, 2019). So, when comparing the Mutualism and Domination beliefs to the value clusters, a lot of overlap can be found. Domination beliefs are similar to the self-enhancement value cluster, both centred around personal gain and enjoyment. While Mutualism beliefs are similar to the self-transcendent value cluster, where both are centred around benefiting others (in this case the animals) and the environment. We can apply the same way of thinking to our findings because people's beliefs are derived from their value orientations (Steg & Berg, 2019). If the conflict between the Mutualism and Domination beliefs is high, in the hedonic condition of our experiment, the promoted behaviour was less stable (zoo support was lowest for people with Mutualism beliefs).

More generally, if we apply the findings of this study to the research question, "*How can zoos frame their educational and conservational efforts to gain more support and acceptance?*" Then our findings do not provide zoos with what can be done to increase visitor acceptance, but they do give information on what zoos should not do. According to our results, zoos should try not to frame information about the zoo in fun or hedonic ways. This

seems to only increase zoo support in those who already support zoos - those with strong Domination beliefs. Instead using hedonic framing or argumentations to promote zoos, decreases zoo support among people who did not like zoos in the first place - those people with strong Mutualism beliefs. Therefore, when trying to promote certain behaviours, zoos should try to avoid any framing techniques in which the framing directly opposes the beliefs or values that one of the groups holds.

When reviewing this study, a couple of strengths and shortcomings should be addressed. When we look at the strengths, we can say that all the measurements taken in this study have been checked and shown to be effective in similar studies. The use of videos in our experiment was justified by findings in a study by Fukano et al. (2020). Where they found that a television programme made a significant contribution to increasing public interest in animals. This seems to contradict the findings by Miller et al. (2020) who found that videos of animals did not have the same impact on visitors as real-life experiences with animals had. Also, the way in which the participants were divided into the two distinct groups, Domination and Mutualism oriented, was based on the assumption that the two beliefs are opposites of each other (Manfredo et al., 2017). We also made sure that the questionnaires were taken from their respective original studies and were altered as little as possible. And lastly, we had a sufficiently large and varied sample, roughly 420 valid responses from 32 different countries.

When looking at the limitations we can start at our sample, the distribution of people who owned a zoo membership compared to those who did not was skewed. Only around 17% of people in our sample noted that they were at some point in possession of a zoo membership (see Appendix B). This underrepresentation of frequent zoo-goers could have led to the smaller sample sizes in the Domination groups, speculating that someone with a zoo membership would be more likely to have stronger Domination beliefs. Because of the

description of people with strong Domination beliefs as being more traditionalistic. Thus, being less opposed to traditional management practices (Manfredo et al., 2020). Another problem we ran into is with the questionnaire, because of the large number of different measurements by the different students, the questionnaire took very long to complete. This meant that some of the participants did not feel motivated to complete the entire questionnaire or lost their focus closer to the end of the survey. The questionnaire was also experienced as having confusing questions, as told by participants. For example, the manipulation check was sometimes interpreted as a common knowledge question, with the hedonic fact seen as false. “*A tiger’s urine smells like buttered popcorn*” was chosen as the hedonic fact for the manipulation check, which is something some people saw as being too ridiculous to be true. So, when designing a manipulation check similar to this one, use a more believable fact to prevent confusion. Despite this the manipulation check was still used in the analysis. Because the large sample size still delivered a lot of valid responses.

The use of videos in our experiment could be justified by findings in a study by Fukano et al. (2020). Where they found that a television programme made a significant contribution to increasing public interest in animals. This seems to contradict the findings by Miller et al. (2020) who found that videos of animals did not have the same impact on visitors as real-life experiences with animals had. Future research could investigate if the effect we hoped to find with this study is better reproduced when the experiment is done in a real-life setting with real animals. This would support the findings by Miller et al. (2020), that real-life encounters work better than their video counterparts.

Something else worth looking into would be how the population of zoo members is comprised, is it predominately comprised of Domination-oriented people or are both Domination and Mutualism-oriented people evenly distributed. The population of zoo members largely consisting of Domination-oriented people would support the assumption that

zoos are viewed as more traditional management strategies (Manfredo et al., 2009) and would indicate that the public image of zoos is still mostly centred around human entertainment. Or research could be done on the reasons why people with strong Mutualism beliefs, who are frequent zoo visitors, keep going to zoos. This could give some insight into what zoos can do to increase support from those with strong Mutualism beliefs.

Even though in this study there was no significant interaction effect found between the experimental framing conditions and the beliefs people had, there was a slight indication of an interaction effect. In future research, it would be interesting to see if with a different approach the same interaction effect could be replicated in a significant way. Maybe this can be done in a longitudinal study design, since people's beliefs are relatively stable, but can be changed over time (Manfredo et al., 2020). Changing people's beliefs is a slow and gradual process which relies on cultural changes and factors like modernization, education income and urbanization (Manfredo et al., 2016). If the interaction effect is significantly replicated it could tell us more about the nature of beliefs and what we can do to influence them. It would also help zoos to understand which type of hedonic framing to avoid. Which would help them increase their acceptability. An example of a study design could be to present participants with the same types of framing done in this study. But this time expose participants to multiple manipulations across a longer period. Or by implementing more educational facts in the manipulations to possibly help facilitate the shift in belief orientations.

In conclusion, this study supports the idea that zoos are viewed as a more traditionalist type of wildlife management, which is something people with strong Mutualism beliefs take issue with. As opposed to Domination-oriented people who are more traditionally oriented (Manfredo et al., 2020). On top of that people value human entertainment as being the least important aspect of zoos. Therefore, when visiting zoos is promoted using hedonic framing, it can have a negative effect on people's acceptability of zoos. Most notably in people with

strong Mutualism beliefs. In this study, an indication was found that beliefs follow the same pattern as the values promoted by de Groot and Steg (2009) when in conflict with each other. So, to increase acceptability, do not use hedonic framing techniques. As they lead to less acceptability in Mutualism-oriented people, instead try to reduce the conflict between the beliefs.

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## Appendix A

### Manfredo's Beliefs questionnaire

Humans should manage fish and wildlife populations so that humans benefit

The needs of humans should take priority over fish and wildlife protection.

It is acceptable for people to kill wildlife if they think it poses a threat to their life.

It is acceptable for people to kill wildlife if they think it poses a threat to their property.

It is acceptable to use fish and wildlife in research even if it may harm or kill some animals.

Fish and wildlife are on earth primarily for people to use.

We should strive for a world where there's an abundance of fish and wildlife for hunting and fishing.

Hunting is cruel and inhumane to the animals

Hunting does not respect the lives of animals.

People who want to hunt should be provided with the opportunity to do so.

We should strive for a world where humans and fish and wildlife can live side by side without fear.

I view all living things as part of one big family.

Animals should have rights similar to the rights of humans.

Wildlife are like my family and I want to protect them.

I care about animals as much as I do other people.

It would be more rewarding to me to help animals rather than people.

I take great comfort in the relationships I have with animals.

I feel a strong emotional bond with animals.

I value the sense of companionship I receive from animals.



**Hedonic frame text*****Hedonic tiger facts***

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

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

A tiger's urine smells like buttered popcorn

Tigers can roar but not purr

**German version**

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

**Dutch version**

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

***Hedonic zoo facts***

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 version:**

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 version:**

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

**Biospheric frame text -*****Biospheric tiger facts***

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, SIBERIAN tiger populations are stable or increasing in India, Nepal, Bhutan, Russia and China.

**German version:**

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

**Dutch version:**

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

***Biospheric zoo***

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%

This zoo teaches visitors about the threats tigers face and how everyone can help

This zoo's breeding program leads to higher birth rates, gene diversity, and cub survival

**German version:**

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 version:**

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

**Attention check**

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

**Manipulation check**

From the following facts, please select the one you saw in the video.

1. A tiger's urine smells like buttered popcorn
2. Siberian tigers live in forests mostly untouched by humans. Out of all tiger species, their home has the most complete ecosystem
3. I didn't see any text

## **Zoo Approval**

Animals in zoos often display natural behaviour

Zoos provide the highest levels of animal care

I am troubled by the well being of animals in zoos

Zoo exhibits are great places for animals to live

It is important to have animals in zoos

It is important to support zoos

I am interested in visiting zoos in the future

I am interested in donating money to zoos

## **Acceptability of zoos**

Please select how acceptable you think zoos are. (-3 = very unacceptable; 3 = very acceptable)

Please select how good you think zoos are. (-3 = very bad; 3 = very good)

Please select how positive you think zoos are. (-3 = very negative; 3 = very positive)

Please select how necessary you think zoos are. (-3 = very unnecessary; 3 = very necessary)

## Appendix B

**Table 1**

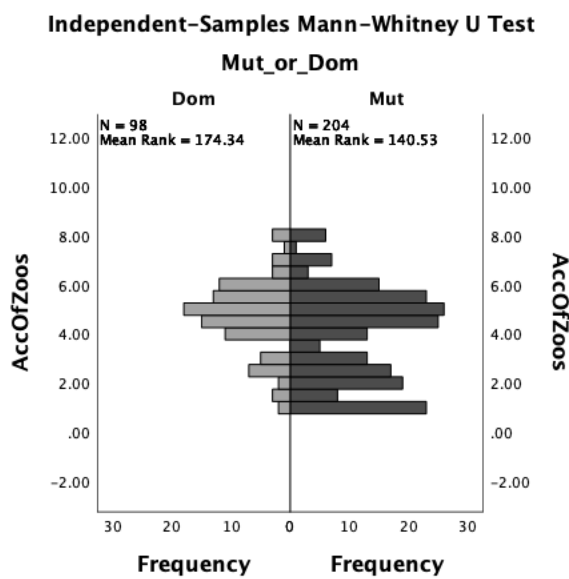
*Distribution of participants*

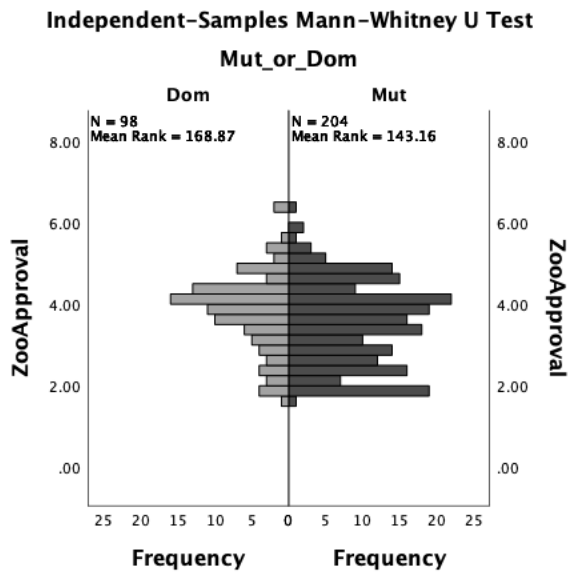
Nationality	Frequency
Albania	2
Argentina	1
Australia	1
Austria	1
Azerbaijan	1
Basque	1
Croatia	1
Czech Republic	5
Egypt	1
England	3
Finland	1
France	3
Germany	172
Great Britain	4
India	19
Ireland	3
Israel	1
Italy	7
Luxembourg	1
Mauritius	1
Mexico	1
Netherlands	98
Norway	1
Pakistan	1
Portugal	1
Romania	2
Scotland	1
Slovakia	1
Spain	1
Sweden	1
Syria	2
Turkey	62
United States	25
Total	426



**Table 2***Distribution of Zoo Memberships*

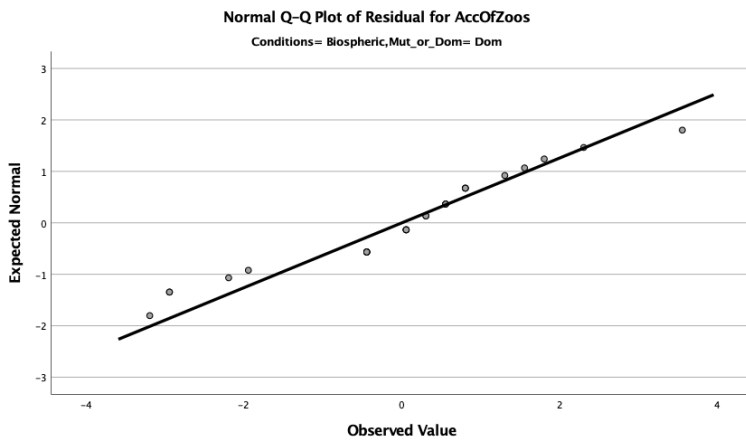
Membership	Frequency
yes	73
no	353
total	426

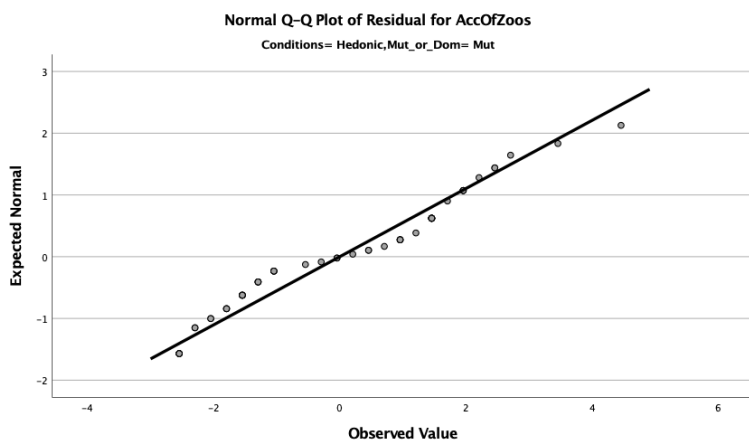
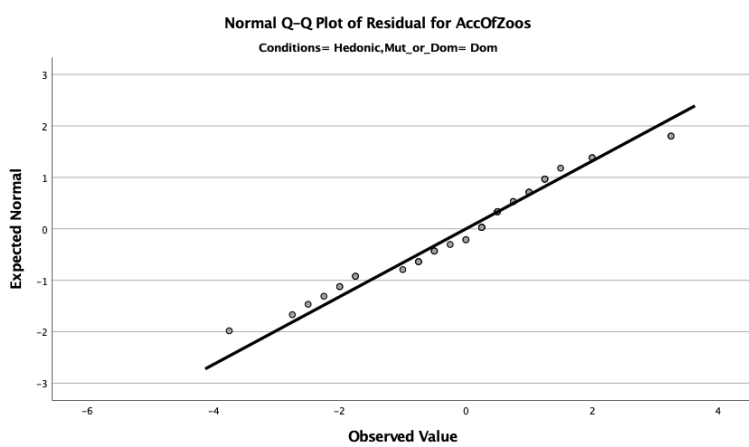
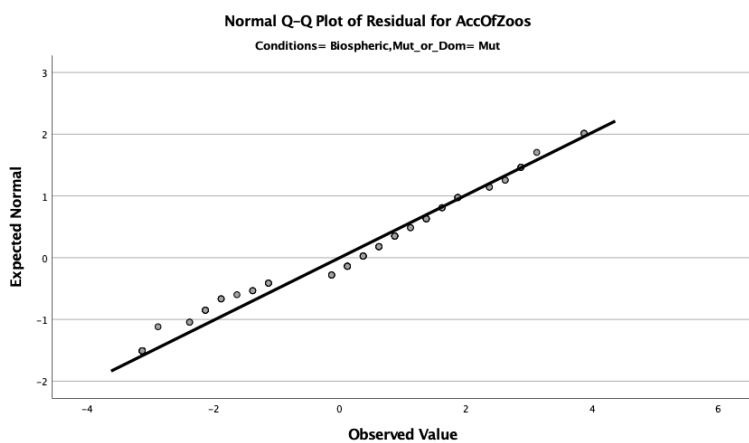
**Figure 3***Assumption Checks Mann-Whitney U Test*

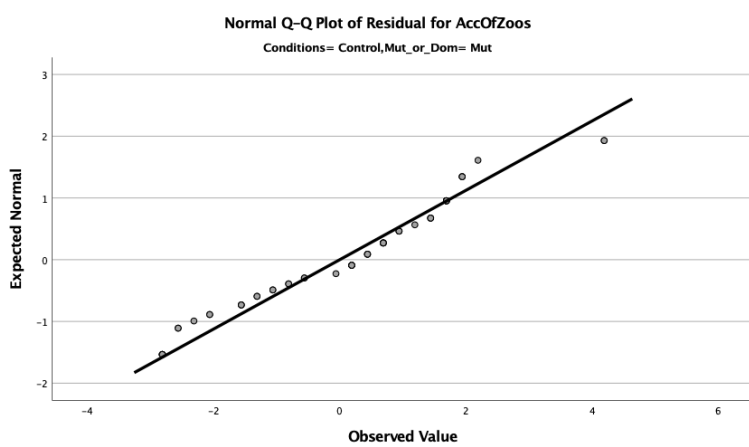
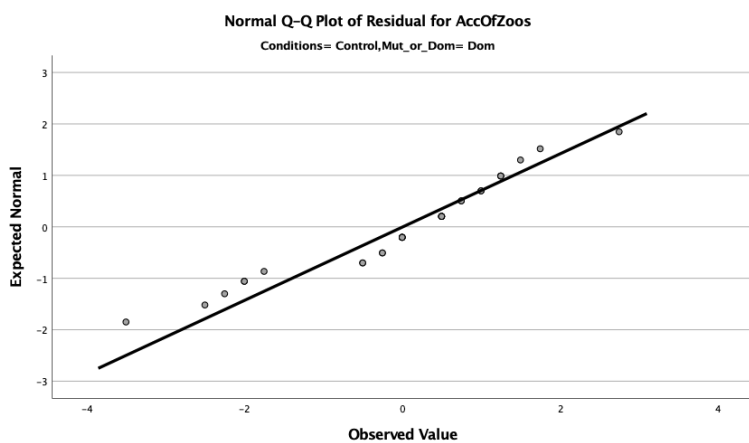


**Figure 4**

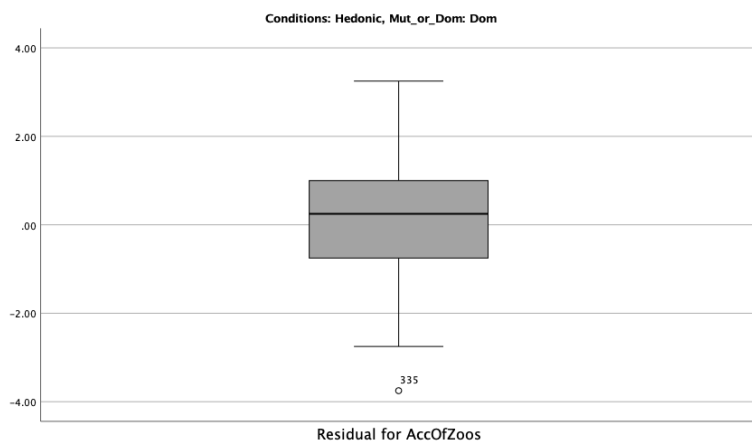
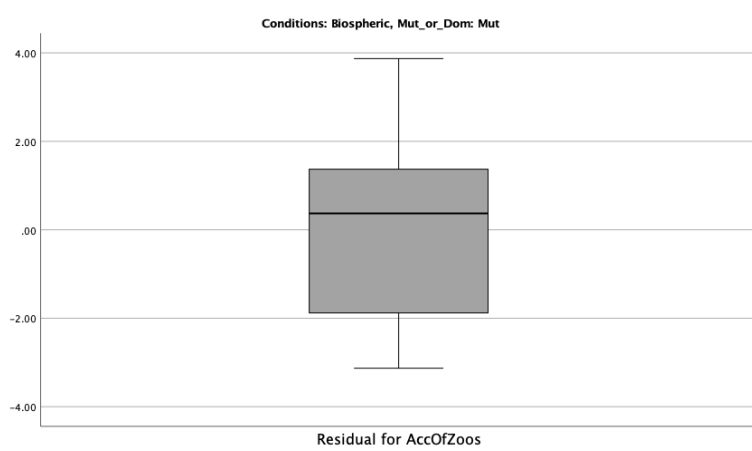
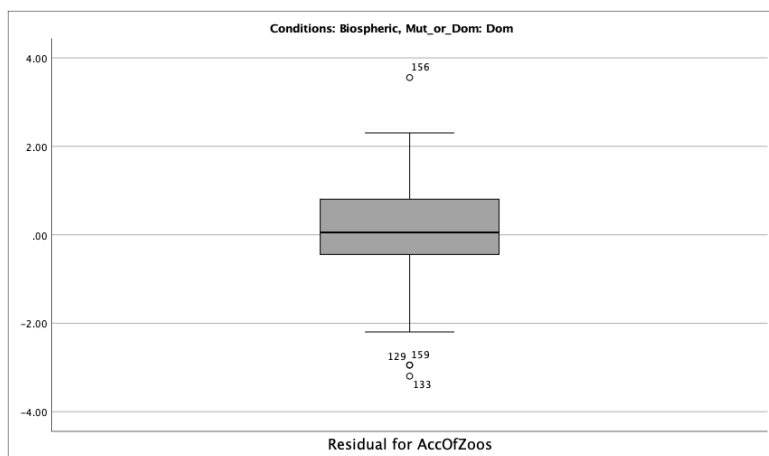
*Assumption checks Two-way ANOVA on Acceptability of Zoos*

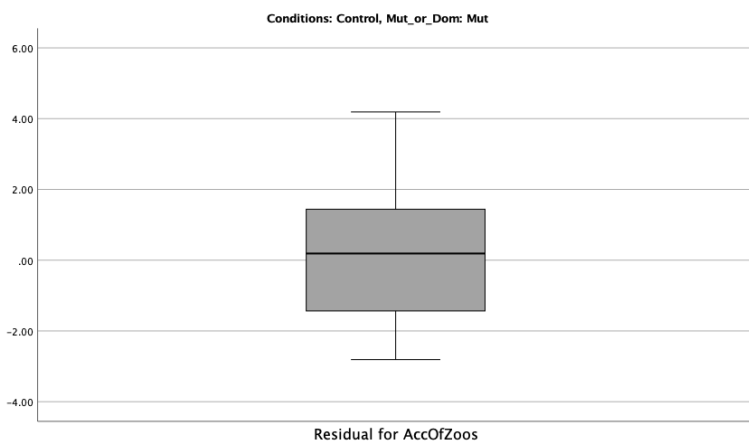
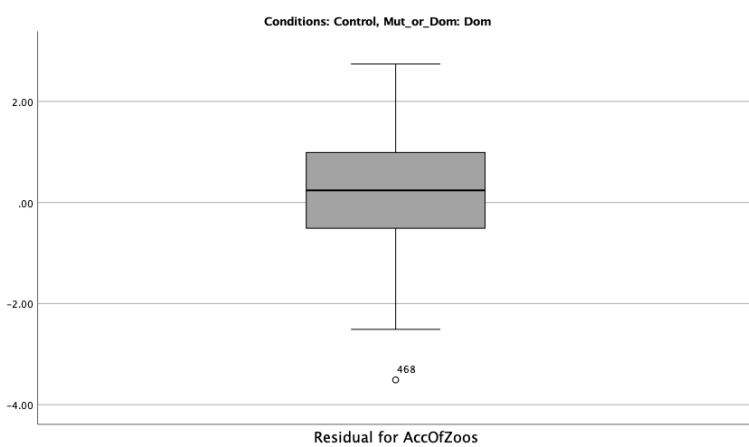
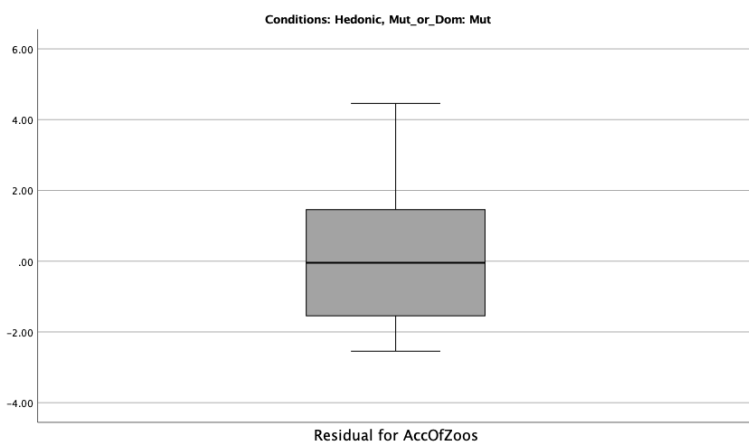


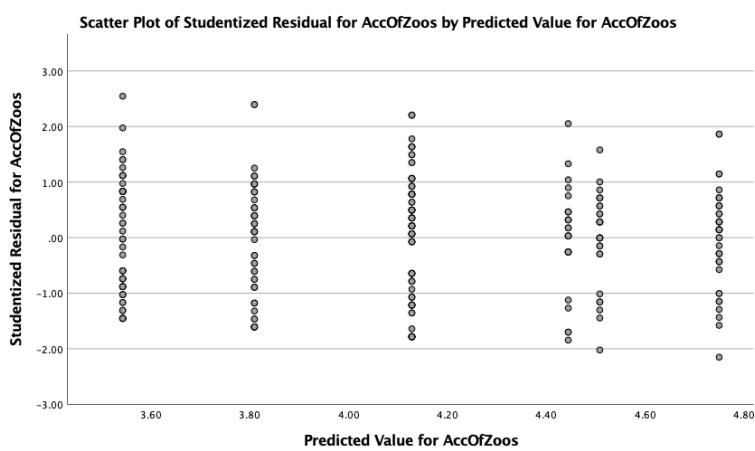
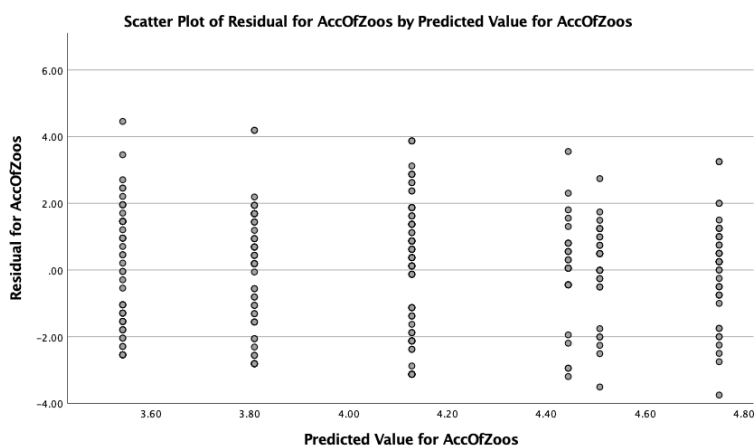




*Note:* Because of the large sample size and the sensitivity of the Shapiro-Wilk test, normality was assessed by Q-Q plots



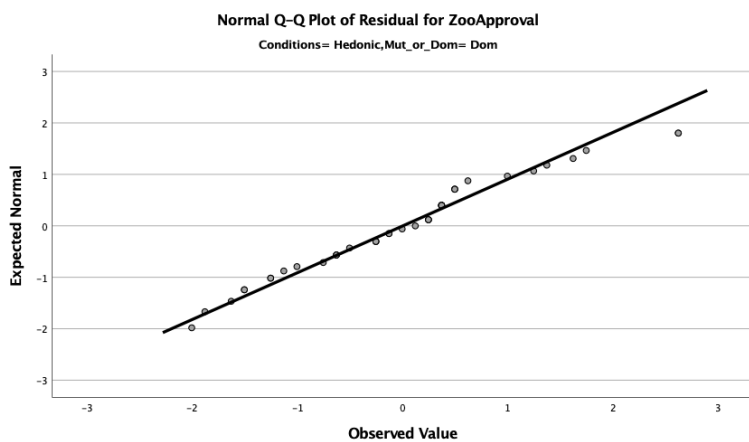
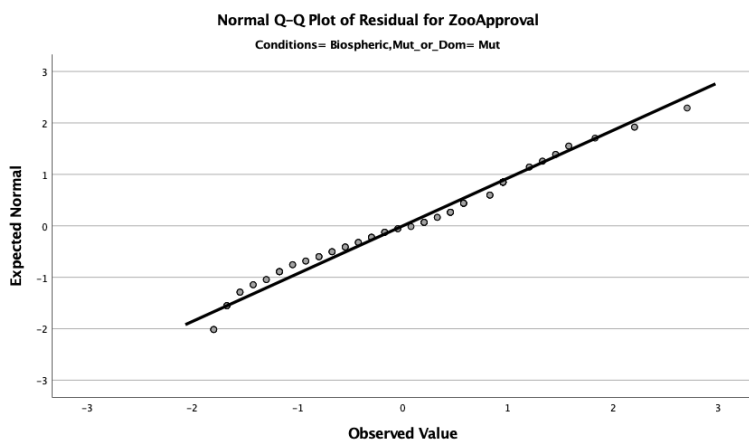
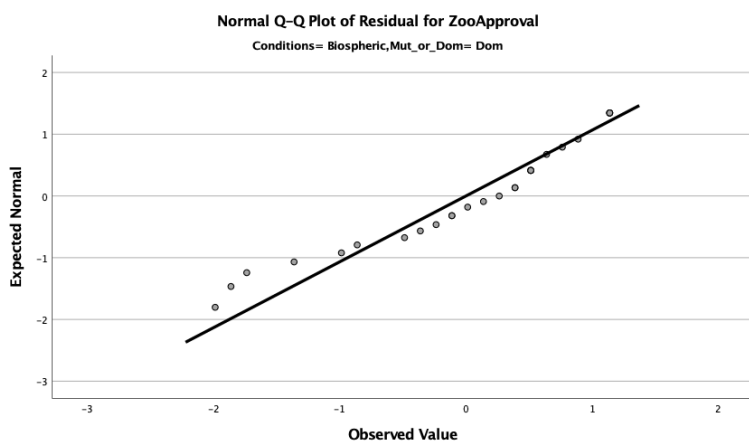




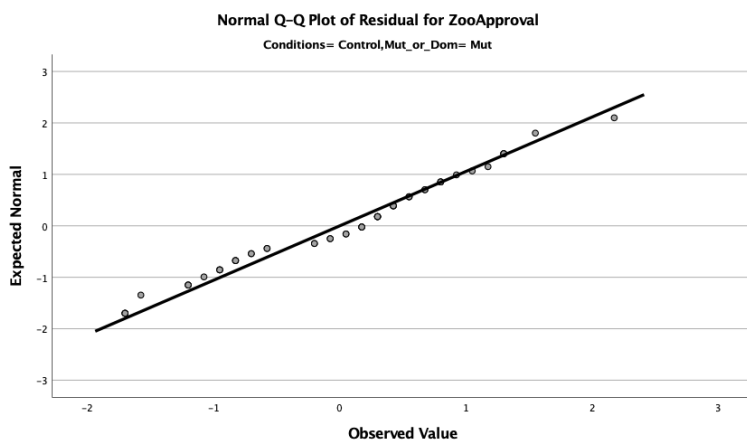
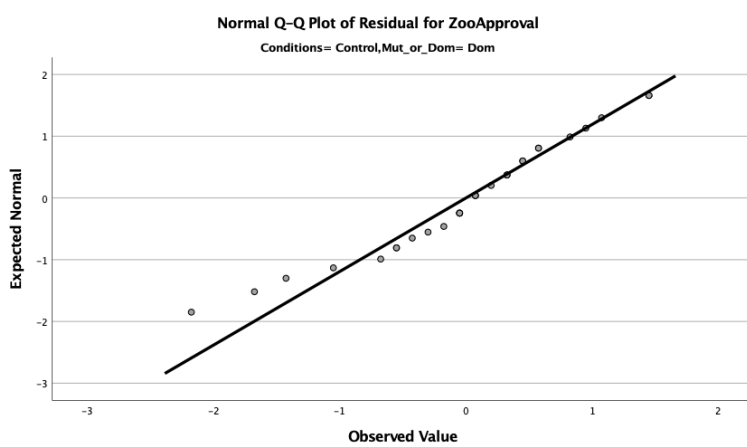
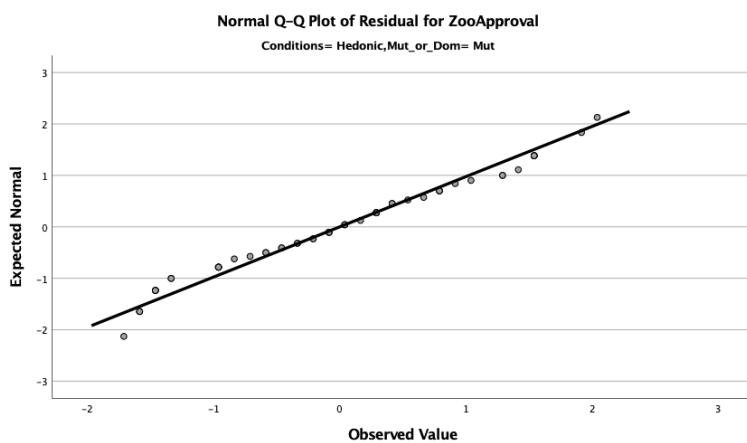
*Note:* Because of the large sample size homogeneity of variances was assessed using scatterplots plotting residuals and studentized residuals against the predicted value of Acceptability of Zoos

Figure 5

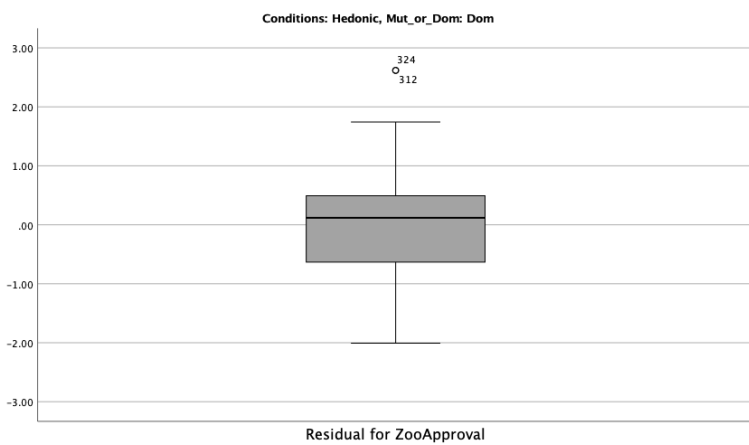
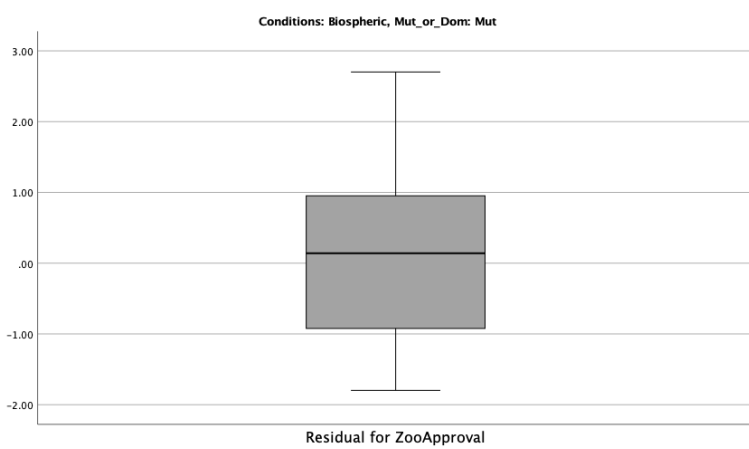
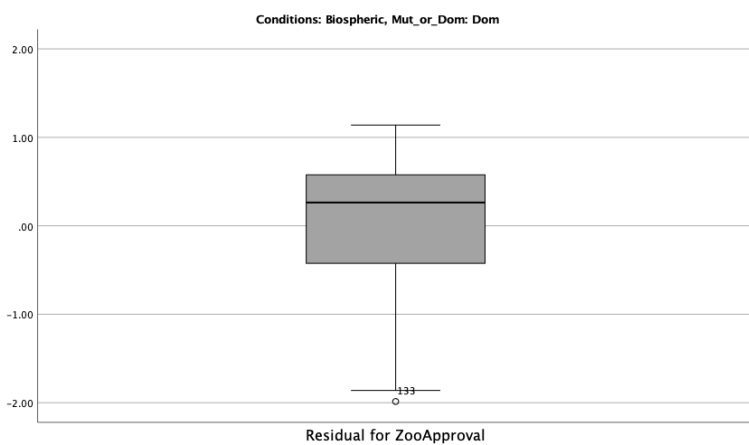
*Assumption checks Two-Way ANOVA on Zoo Approval*

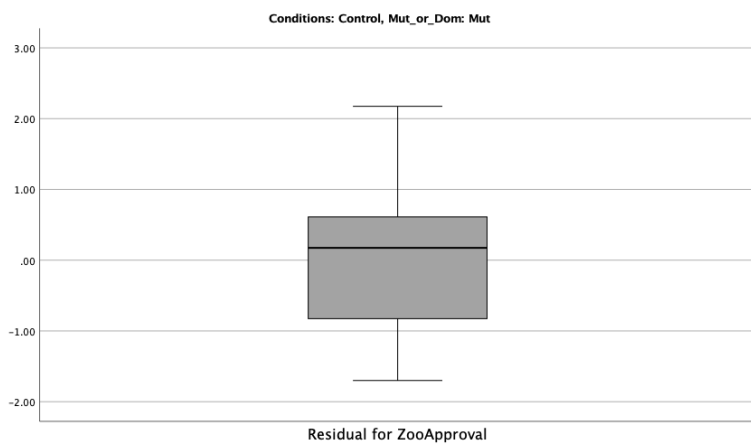
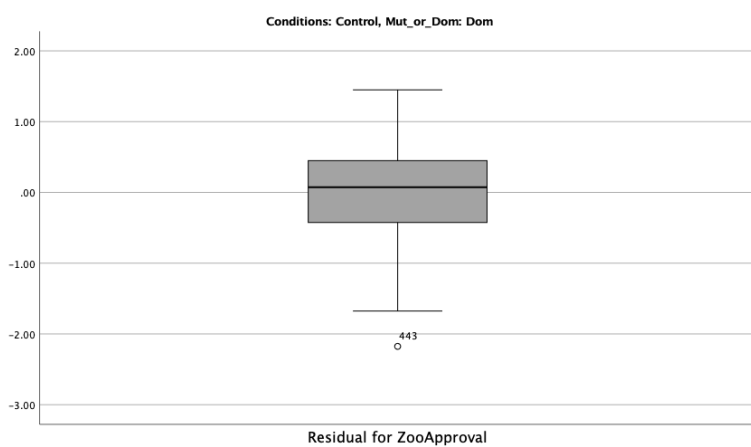
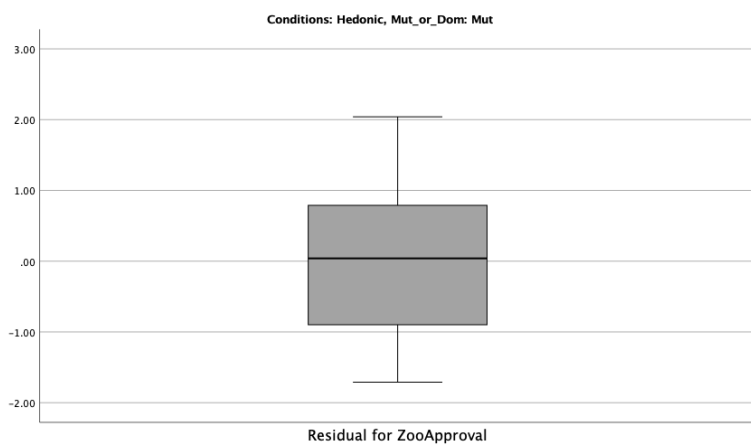


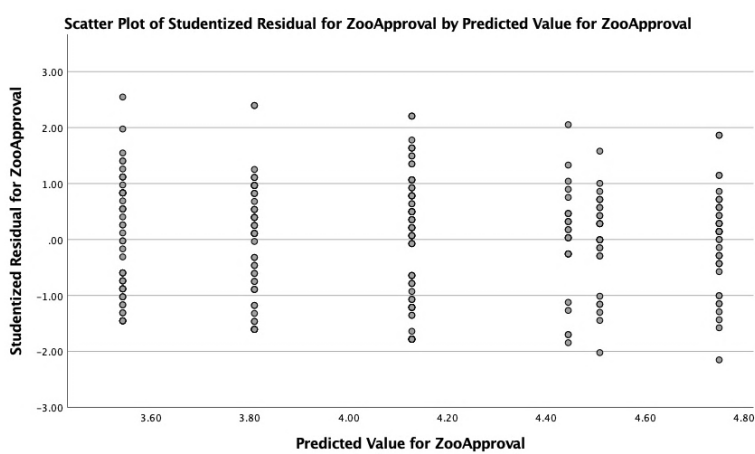
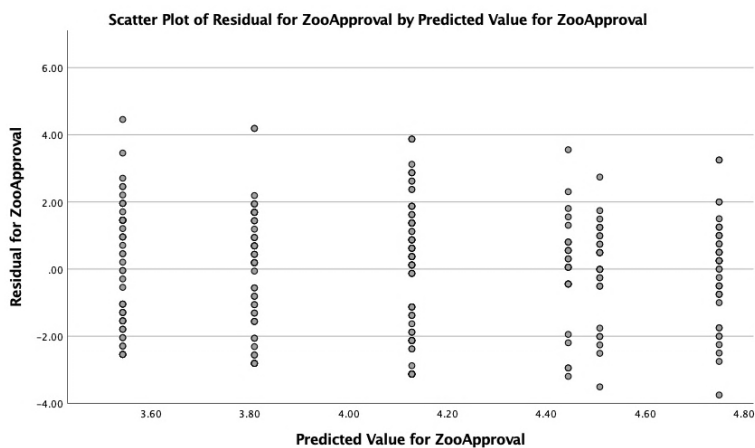




*Note:* Because of the large sample size and the sensitivity of the Shapiro-Wilk test, normality was assessed by Q-Q plots







*Note:* Because of the large sample size homogeneity of variances was assessed using scatterplots plotting residuals and studentized residuals against the predicted value of Acceptability of Zoos