Factors that foster pro-environmental behavior intentions in zoo visitors

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Abstract

Biodiversity has suffered significant loss, primarily as a result of human activity. Researchers must therefore look into ways to encourage appropriate pro-environmental behavior intentions and behaviors in order to mitigate this loss. Since protecting species and their habitats is a major objective of zoos, our study concentrated on how these zoos may play a significant role in bringing about these changes. Additionally, in order to accomplish these goals, they must also overcome their reputation as sites of entertainment. Therefore, the current study focuses on the use of entertaining or educational message framing for texts within animal videos to determine which is the best possible step zoos can take to influence the highest intentions, as well as how participants' pre-existing mutualistic beliefs can moderate this relationship. After watching the videos, participants responded to questions in an online survey that reflected their beliefs and conservation caring. Their PEB intentions were unaffected by message framing. Additionally, there was no noticeable difference between the entertaining and educational frames, indicating that neither one was more effective at encouraging PEB. Finally, the relationship between framing and PEB intentions was not moderated by mutualistic views. These findings suggested that, to increase our participants' PEB intentions, the framing should have evoked concern for the animal rather than only providing information about it.

Keywords: biodiversity, loss, pro-environmental intentions, behaviors, PEB intentions, zoos, message framing, videos, educational, entertaining, conservation caring, mutualistic beliefs

Factors that foster pro-environmental behavior intentions in zoo visitors

As a result of human actions, the environment has suffered considerable environmental damage and biodiversity loss (Keil et al., 2015). Reasons for this range from pesticide usage for plant protection (Brühl & Zaller, 2019) to deforestation and plant degradation for housing, food, and agriculture (Reid & Miller, 1989; Swaney & Olson, 1992; Chu, 2006). Everyday habits, such as the use of cars, are also significant contributors to global environmental contamination (de Groot & Steg, 2008). These consequently destroy the species' habitats and endanger them in the same process (Kerr & Deguise, 2004). To avoid further biodiversity loss, people must be adequately influenced to engage in pro-environmental behaviors (PEBs), which are defined as "those behaviors that change the availability of materials or energy from the environment or alter the structure and dynamics of ecosystems or the biosphere positively" (Stern, 2000; de Groot & Steg, 2008). Examples of PEBs include donating, signing petitions, and recycling (Smith, 1995). PEBs must be adopted to contribute to the conservation of these habitats and species to manage biodiversity loss; however, they do not successfully manifest without a preceding PEB intention (de Groot & Steg, 2008). Since conservation of species and habitat goals are well aligned with the goals of zoos (WAZA, 2005), zoos can assist in the influence of such intentions on their visitors in order to combat biodiversity loss.

Zoos, which comprise diverse arrays of biodiversity, including species we do not expect to see daily, welcome up to 700 million visitors per annum (Dick & Gusset, 2010). The Association of Zoos and Aquariums (WAZA, 2005) outlines four distinct goals of these institutions, out of which two of the more important ones are targeted at educating this large audience and fostering species and habitat conservation (Patrick et al., 2007). For zoos to encourage such long-term behavior in their visitors, they must make them aware of the

environmental concerns that have been identified (Gusset et al., 2014). However, in addition to the essential aims of zoos previously indicated, the goal of human entertainment for commercial purposes has also been raised over the years (Gusset, Jensen, and Moss, 2014). This can serve as an attractor of a greater audience for successful marketing. However, this obscures the habitat and species conservation aim (Carr & Cohen, 2011) and makes many people hostile toward zoos (Tribe & Booth, 2003). As a result, zoos must place a high priority on achieving goals that benefit the planet. Therefore, this paper aims to investigate how zoos can effectively foster PEB intentions in their visitors.

Framing

Zoos must devise an effective method to fulfil their goal of species and habitat conservation by promoting public awareness of biodiversity issues and encouraging individuals to participate in PEB. Using "message framing" is one approach to achieving such results (White et al., 2011). Since it has been known to be important in forming an insightful conservation message for the viewers, framing has been influential across a variety of domains, including business (Levin et al., 1998), health (Pounders et al, 2015), communication (White et al., 2011), and even marine conservation (Kolandai-Matchett & Armoudian, 2020). It is "a communication approach aiming to alter perceptions, attitudes, and judgments," as per the definition. People's attitudes and behaviors are influenced by frames, which cause them to perceive, interpret, and evaluate information in specific ways (Chong & Druckman, 2007; Entman, 1993). Regarding communicating about animals and feeling connected to them, Seattle Aquarium (2015) also emphasizes the significance of "framing." According to this article, there are two important aspects to framing: (1) how we frame our talks about animals and (2) the words we use. As a result, it can be a valuable strategy for encouraging zoo visitors to engage in PEB intentions and

behaviors, as well as changing any other preconceptions (that obstructed these intentions), if they had any, to aid conservation (Pelletier & Sharp, 2008).

Rebolo-Ifr'an et al. (2019) found that YouTube videos are one of the most popular ways to successfully deliver a message to an audience, mainly through message framing, to lead to the requisite conservation intentions and actions. Suppose a video features a species of wildlife with commentary (such as information) about it and is presented in a way to transmit a conservation message. In that case, we can move closer to their objective by boosting PEB intentions in their viewers (Vins et al., 2021). Furthermore, the data in these videos do not have to be entirely focused on why conservation is essential – if it can educate the audience in any way, it will bring awareness to the viewer, and hence, conservation will advance (Pearce, 2007; Wright et al., 2015)**.** Zoos can try to use such YouTube films by educating viewers about an animal using educational information that is not explicitly focused on the need for conservation but rather on raising awareness and informing them about that animal.

Zoos, however, are a source of controversy because they have long acted as sites of human entertainment and pleasure, notably undermining their conservation goals (Carr & Cohen 2011). Simply put, if they focus more on entertaining their audiences rather than educating them, they will not be able to address the problem of habitat and species loss and in turn, the bigger issue of biodiversity loss. Therefore, if videos are framed with messages aimed at the viewer's enjoyment and pleasure, it will disrupt conservation goals (Carr & Cohen, 2011). Some entertaining facts with the combination of a video of a zoo animal might also be considered a source of hedonic entertainment, with the sole objective of such a program being the sensation of positive emotions such as happiness or pleasure (Vorderer et al., 2004). It is, thereby, important for zoos to investigate how exactly they should frame the information about an animal. Whether

video messages are structured in an educational (by presenting educational facts about an animal) or an entertainment (by presenting fun or entertaining facts about the same animal) frame may result in different PEB intention outcomes among viewers. Based on the information presented in the preceding paragraphs, it is possible to infer that educationally framed messages are far more effective than entertainment-framed messages in fostering PEB intentions in viewers. To achieve the desired conservation goals, raising awareness about an animal is considerably more important than entertaining the audience.

Moderating effect of Mutualistic Beliefs

Even though framing is linked to PEB intentions, we must not rule out the possibility of other factors influencing the previously stated relationship. Even though two people share the same views, when it comes to animals, they may act in entirely different ways (Manfredo et al., 2009). As a result, it is critical to comprehend how this may affect the impact of educational or entertainment-framed video messages on PEB intentions among our participants. If their ideas favor animal welfare and care, for example, they may be more responsive to conservation goals regardless of the framing they are exposed to. Therefore, beliefs may function as a moderator in the interaction between the videos and PEB intentions.

Understanding the reasoning behind this requires defining beliefs. These are "schematic networks of beliefs that organize around values and that give contextual meaning to these values" (Smith, 1998). Some people will care for all animals, no matter how dangerous, while others might care about them but will be ready to exploit them for personal gain, such as hunting for food. Therefore, there are two dimensions of beliefs: domination and mutualism (Manfredo et al., 2009). Those with high dominance beliefs believe that wildlife should be used to benefit humans, and that wildlife is less important than human well-being (Jacobs et al., 2018). On the

other hand, people with high mutualistic beliefs see wildlife as capable of relationships and trust with humans and believe it deserves the same rights as humans (Manfredo et al., 2009). Mutualistic people will be more likely to have care and concern for an animal because they are an extension of their social network than people with dominant beliefs. Given this information, and also that beliefs are considered stable (Manfredo et al., 2009), we can assume that mutualistic beliefs might play a significant role in strengthening the effect of framed messages on inducing PEB intentions. Therefore, our study hypothesizes that framing will lead to higher PEB intentions for participants with high mutualistic beliefs than for participants with lower mutualistic beliefs.

Present Study

To summarize, our research question addresses how zoos can take part in fostering PEB intentions in their visitors, address the threats to habitats and their species, and in turn, mitigate the issue of biodiversity loss. The study will consist of three groups of participants allocated to three conditions – an educational frame video, an entertainment frame video, and control (with no text). According to the pre-existing knowledge discussed above, framing should have an effect on PEB intentions, the educational frame should be better at inducing PEB intentions in participants, and mutualistic beliefs should moderate this relationship between the videos and PEB intentions. Therefore, this study explores three hypotheses: (1) both framed videos will induce higher PEB intentions in participants than in the control video, (2) the educational frame will induce higher PEB intentions in participants than the entertainment frame, and (3) for participants with high mutualistic beliefs, framing will lead to higher PEB intentions than for participants with lower mutualistic beliefs.

Method

Participants

This study used a convenient sampling method (snowball sampling technique), where the research team initially recruited family and friends through email or social media. 576 people started the survey, of which 498 gave informed consent. Participants were then filtered based on a few measures (see appendix A). Consequently, 229 subjects were removed from the sample, hence the total number of participants was 347. We did not exclude participants who failed the manipulation check, as data displayed that the participants in the control group got the manipulation wrong more than the others. In the sample, there were 39.8% male, 58.5% female and 1.7% non-binary or other, with ages ranging from 18 to 85 ($M = 38.7$, $SD = 16.34$). There was no compensation for participation. The sample included mostly participants from Germany and the Netherlands, but also plenty of other countries (see appendix A). They were required to speak either English, Dutch or German. Additionally, the participants had to be at least 18 years old to participate in the research.

Design

A between-groups experiment was conducted with two experimental conditions and a control group. The independent variable was the level of the manipulation, framing information in either an educational or entertaining way. As this study was conducted as part of a more extensive bachelor's thesis project, the specific variables of interest were chosen from a more extensive list of materials: values, beliefs, conservation caring, zoo approval, acceptability of zoos, and the perceived role of zoos. For this particular study, the moderator variable was beliefs and the dependent variable was conservation caring.

Materials & Procedure

The study was conducted through Qualtrics XM. Participants were first asked to complete questionnaires regarding their demographics (age, gender, nationality), values (Bouman et al., 2018), and beliefs (Manfredo et al., 2009).

The beliefs questionnaire, which was measured on a 7-point scale from strongly disagree to strongly agree, explored whether participants had either domination ($M = 3.68$, $SD = .837$, $\alpha = .739$) or mutualism ($M = 4.41$, $SD = 1.21$, $\alpha = .881$) orientations toward wildlife. Participants were, for example, asked to state how much they agree with statements such as, "wildlife are like my family and I want to protect them" or "hunting is cruel and inhumane to animals".

After filling out the pre-manipulation measures, participants had to watch a 4:27 minute-long video (taken from Leipzig zoo) of Siberian tigers or Panthera tigris altaica playing in a zoo enclosure. In the video, participants in the experimental groups were given different information about tigers. The entertainment-frame group was presented with eight fun facts about tigers in the wild and the zoo (see Appendix A). The facts consisted of information such as "A tiger's roar can be heard about 3 kilometers away". The educational frame group saw eight statements focusing on tiger habitats, endangerment, and conservation efforts (see Appendix A). The information presented for this group consisted of facts such as "Non-sustainable palm oil production is destroying tiger habitats in Indonesia and threatening the tiger population". The control group watched the video without any additional information.

Following the manipulation, the participants were asked to complete a questionnaire on their PEB intentions through the second part of the conservation caring scale (Skibins & Powell, 2013; $M = 6.23$, $SD = 2.23$, $\alpha = .879$). This was measured on a 9-point scale from strongly disagree to strongly agree. This included statements such as, "I would write a letter/sign a petition to a government official supporting the protection of this species" to assess their care and

concern for the tiger species in the video and their behavior orientations, and intentions to participate in behaviors that supported their conservation.

The participants first received information about the study and gave informed consent to their participation. After choosing their preferred language, they completed the pre-manipulation questionnaire, including demographics, values, and beliefs. Following that, Qualtrics randomly assigned subjects to one of the manipulation conditions, after which the post-manipulation questionnaire was filled out, which included conservation caring. To check whether they were paying attention, we added an item to the conservation caring scale, asking the participants to click "agree" if they were paying attention. Additionally, (after the manipulation), we set up a manipulation check, asking participants to select out of three facts the one they just saw in the video. In the end, a donation link was placed tracking how many subjects would click on it, measuring direct pro-conservation behavior. Completing this survey took participants approximately 20-30 minutes.

Results

This study aimed to evaluate how successful framing is at fostering PEB intentions in zoo visitors. Our study consisted of a video manipulation with different frames of text. The pre-manipulation variables tested for were beliefs (Manfredo et al., 2009), and the post-manipulation variables were PEB intentions on the Conservation Caring scale (Skibins & Powell, 2013).

To test the first hypothesis which predicted that the prevalence of PEB intentions was higher in the framing groups than in the control group, we used a one-way ANOVA analysis. The main three one-way ANOVA assumptions – continuous dependent variable (PEB intentions), a categorical independent variable with three groups (framing – value-based, entertaining, control), and independent observations – were all satisfied. There were no outliers,

(see fig.1, Appendix A). The Quantile-Quantile plots (fig.2, Appendix A) for each condition revealed that the data of PEB intention scores were normally distributed. There was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p = .058$). Therefore, all the assumptions of an ANOVA analysis were met.

Contrary to expectations, the analysis indicated that the differences between conditions were not statistically significant, $F(2,344) = 1.48, p = .228$. PEB scores were also calculated for the educational ($M = 3.18, SD = 1.36$), entertainment ($M = 4.14, SD = 1.54$), and control ($M = 3.95, SD = 1.42$) frames. These results indicated that framing did not have an effect and that participants' PEB intentions did not differ depending on the frame they were allocated to.

Secondly, our study wanted to test whether the educational frame induces higher PEB intentions in participants than the entertainment frame. At first glance, the entertainment framed text appeared to be more effective in inducing PEB intention than the educational framed text, as shown in the means plot (fig. 3, appendix A). We used a simple contrast analysis to investigate if this difference was significant. The results illustrated that there was no statistically significant decrease in PEB intention from the entertainment frame ($M = 4.14, SD = 1.54$) to the educational frame ($M = 3.18, SD = 1.36$) with a mean decrease of 0.323, 95% CI [-.694, .048], $p = .087$. While the means appeared different, there was so significant difference between the two groups, so our hypothesis that the educational frame was better at inducing PEB intentions in our participants was not supported either.

Hypothesis three predicted that mutualistic beliefs moderated the effect of framing on PEB intentions. To begin, a linear regression analysis was conducted to verify the moderation assumptions. An interaction term between the dummy coded framing groups and the continuous mutualistic beliefs to check the assumptions of a moderation analysis: linearity,

homoscedasticity, no outliers or multicollinearity, and normal distribution of residuals. All of these assumptions were met, so we proceeded with the moderation analysis by using PROCESS by Hayes (2013) to check the interaction between the frames and mutualistic beliefs.

Contrary to expectations, the interaction between the educational frame and mutualistic beliefs ($B = .070$, 95% C.I. [-.187, .328]*, p = .591*), and between the entertainment frame and mutualism value orientations ($B = .121$, 95% C.I. [-.120,.362], *p = .325*) were both not significant. Therefore, mutualistic beliefs did not act as a moderator for the relationship between framing and PEB intentions in our sample.

Discussion

This study aimed to investigate how zoos can foster PEB intentions in visitors as a step toward addressing the problem of biodiversity loss. We planned to assess the best strategies for zoos to achieve their species and habitat conservation aim via videos about a certain tiger, which included different types of framed messages (i.e. educational and entertainment frames). Specifically, we investigated whether the framed videos induced higher PEB intentions than the control. We also hypothesized that the educational frame induces higher PEB intentions than the entertainment frame to determine which framing strategy is ideal for the zoos. Finally, we anticipated that mutualistic beliefs moderated the link between framing and PEB intentions. We were unable to find evidence to support any of our hypotheses. Therefore it is critical to investigate potential reasons for why this occurred.

Practical and Theoretical Implications

Our first hypothesis aimed to see whether the videos containing the frame were better at inducing. This was pertinent to our research since several studies have explored the use of

framing as an effective communication tool for the result of actions that lead to species conservation (Kolandai-Matchett & Armoudian, 2020; Jacobson et al., 2018). However, the findings of this hypothesis revealed no significant differences across the groups, indicating that the framing of the messages had no effect on inducing PEB intentions in our participants. For the entertainment frame, this finding makes sense as Carr and Cohen (2011) noted the possible obscurity of conservation goals if an emphasis is placed on entertainment in zoos. Simply put, the entertainment frame acted solely as enjoyment or pleasure for the viewer, which is why the PEB intentions were not significantly different from the control video with no messages at all. However, for the educational frame, our results contradicted Vin et al.'s (2021) findings, which displayed the successful use of educational framing within YouTube videos. The insignificance of the difference between the educational frame and control groups indicates that the messages used within the respective video did not successfully induce PEB intentions as intended for our research question.

We also hypothesized that the educational frame induced higher PEB intentions in participants than the entertainment frame, based on the controversy of zoos being viewed as places of entertainment and how important it is for zoos to focus more on educating their visitors rather than earning money through this entertainment, to achieve the goal of species and habitat conservation (Carr & Cohen, 2011). Although this literature has deemed it important for zoos to focus on education and not entertainment for successful influence on their audience, our data showed no significant differences between these two groups. The participants did not successfully grasp the educational message, unlike earlier research evaluating framing through education (Aldecoa et al., 2021). As mentioned in the previous paragraph, these results imply that there was no influential effect of the educationally framed messages as intended.

The findings above suggest that simply informing the audience about an animal without emphasizing why conservation is essential is not enough to bring about the desired effects, as specified in Pearce's (2007) and Wright et al.'s (2015) articles. Our video was somewhat educational, as it described facts such as "tigers contribute to the health of ecosystems by keeping herbivore populations under control" and "Siberian tigers live in forests mostly untouched by humans; out of all tiger species, their home has the most complete ecosystem". However, these did not seem to influence people to plan on engaging in PEB for the tiger's conservation. Hence, it seems important to apply different framing methods to our study.

The third hypothesis investigated whether mutualistic beliefs influenced the relationship between framing and PEB intentions. Since people who value mutualism are more concerned about biodiversity, we predicted that the relationship tested above would be moderated by mutualistic beliefs (Manfredo et al., 2009). However, our findings did not support this hypothesis. This contradicts the findings of Manfredo et al., (2009), which found that people with higher mutualistic beliefs are more likely to engage in "welfare-enhancing" acts like feeding and caring for abandoned or injured animals, which can be contributors to species conservation.

After seeing a video with an educational frame, one may anticipate a person with a greater mutualism orientation to be more inclined to have PEB intentions, but our data revealed no such pattern. This, similar to the previous points mentioned above, also indicates that the message within the video was the issue – the participants with higher mutualistic beliefs were unaffected since the language was not concerning enough to target their pre-existing beliefs.

Limitations

Our study shows that our educational message was ineffective. Unlike our study, Aldecoa et al., (2021) were able to illustrate the effectiveness of framing in YouTube videos for PEB. Our study showed no such findings, indicating a limitation within the manipulation itself. We did not consider what approaches to use to frame these texts. Previous research has stated that various types of frames are predictive of the anticipated conservation outcomes among viewers – value-based, emotional, problem/solution oriented, outcome (loss or gain), distance, and social norm (Kolandai-Matchett & Armoudian, 2020; Jacobson et al., 2018). For example, a value-based frame would have been effective since people's willingness and intentions to participate in PEB are greatly influenced by these stable, underlying values (de Groot & Steg, 2008; Olson & Zanna, 1993; Stern, 2000). Furthermore, since beliefs are targeted after values (de Groot & Steg, 2008), it would make more sense to target these values first. If the educational facts had elicited concern for the tigers, biospheric values (that result in more PEB engagement) would have been made salient, after which the beliefs would have been targeted (de Groot & Steg, 2008). Instead of merely informing people about the habitats of tiger species and their relevance in the environment, the texts could have sparked great concern among participants by noting the threats they face or even by suggesting solutions to these problems with certain behaviors people can perform to help these species. Therefore, ignoring the mentioned frames and just showing informative and educational facts about the species was insufficient for the desired results.

Another issue raises the question of whether the successful influence of PEB intention has short- or long-term consequences. Our primary goal is to encourage zoo visitors to engage in behaviors that will result in positive changes to biodiversity. However, our study seems to only measure PEB intentions on the spot, after watching the video. We can indeed replicate this study by using an effective framing method as mentioned in the previous paragraph. Still, it will not

show whether these effects on intentions led to persisting PEBs necessary for species and habitat conservation. The fundamental goals of species and habitat conservation will not be realized if these beneficial effects of successful PEB intention influence are simply momentary. Preventing the extinction of an endangered species is one example. Troëng and Rankin (2005), demonstrated how long-term conservation initiatives might reverse nesting declines in the endangered green sea turtles. Zoos must influence long-term PEB intentions about endangered species or habitats, as it will result in visitors not only participating in immediate, beneficial PEBs but also in these behaviors persisting for prolonged periods, thereby rewarding the species involved. Our study merely measures these intentions on spot, after watching the videos. It is not exactly clear to us whether these intentions persisted among our participants for the respective PEBs, and their effect on the overall goal of species and habitat conservation. Therefore, a longitudinal study would have been the best to check whether these intentions resulted in the desired PEBs even a long time after the study had been conducted.

Despite the limitations of our study, it does highlight a few beneficial aspects. We were able to obtain a large sample of participants, for example. Our data was gathered from people of diverse ethnicities and ages, allowing it to be generalized to the broader population. In other words, the findings of this study may be used in a variety of situations, which is extremely beneficial to zoos. Data such as this would help them discover what works and what does not for their specific species and habitat conservation aims. Because our findings did not support our hypotheses, they can pave the way for future studies that will help visitors have PEB intentions through message framing.

Future Research

Since previous research has only applied the frames to marine species conservation (Kolandai-Matchett & Armoudian, 2020), and only a few have used the "loss or gain" framing for flagship species (Jacobson et al., 2018; White et al., 2011), future research can aim for a value-based frame, knowing the importance of values in determining PEB among people (de Groot & Steg, 2008) Furthermore, because PEB intentions raise the question of whether or not the resulting pro-environmental behaviors will be long-term, researchers should conduct longitudinal studies to track not just PEB intention but also PEB itself. Our study only tests immediate PEB intentions after the manipulation, so it is rather difficult to tell whether these intentions influenced PEBs over the long term or not. If we conduct a longitudinal study that measures not only PEB intentions but also PEB itself, it will allow them to verify that people have changed their lifestyles and addressed the problem of biodiversity loss via conservation practices, as well as that zoos have achieved their aim of species and habitat conservation through message framing.

Gender is an additional factor to consider. Even if the large sample size improved generalizability, it would still be beneficial to investigate whether gender had an impact on the outcomes. In general, many studies have shown women to have more concern for the environment than men (Tindall et al., 2003), therefore we can assume that women would be more influenced than men to have PEB intentions after receiving a value-based message that raises concern about a particular species. Additionally, this might imply that alternate frame designs would elicit better responses from men. If this is the case, it would be beneficial to find out which frame technique suits them the most. This would make it possible for studies to help zoos in understanding appropriate methods of targeting their audiences and fostering PEB intentions and behaviors in them.

Conclusion

The aim of the study was to assess the best approaches for zoos to reach their species and habitat conservation goals, particularly by instilling PEB intentions in their visitors via message framing. We were unable to confirm the relationship since our findings did not support our hypotheses. Future studies can use this research to look at other kinds of framing zoos might use as a step to influence their vast audiences and achieve their conservation aims, over a longer period, essentially to reverse biodiversity loss in the process.

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Appendix A

List of countries participants were from

Albania, US, Azerbaijan, Basque, Great Britain, Luxembourg, Croatia, Czech Republic, Egypt, France, India, Ireland, Izrael, Italy, Mexico, Norway, Austria, Pakistan, Portugal, Romania, Scotland, Slovakia, Sweden, Syria, and Turkey

How participants were filtered out

1. Completed the survey in less than 600 seconds

2. Were aged less than 18

3. Did not pass the attention check

4. Did not give consent

5. Did not complete the survey

Facts presented to participants

Entertainment frame

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

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

3. A tiger's urine smells like buttered popcorn

4. Tigers can roar but not purr

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

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

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

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

Educational frame

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

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

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

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

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

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

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

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

Appendix B
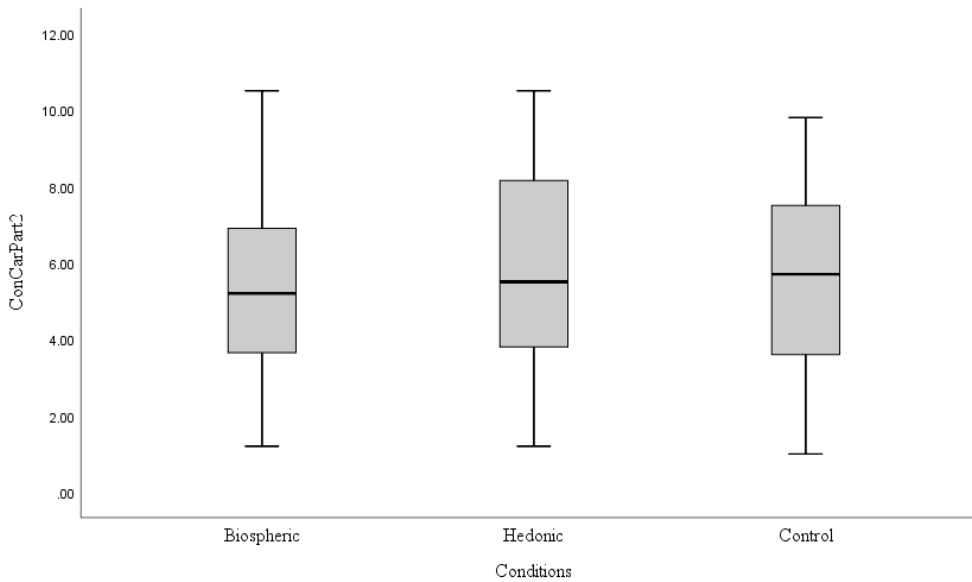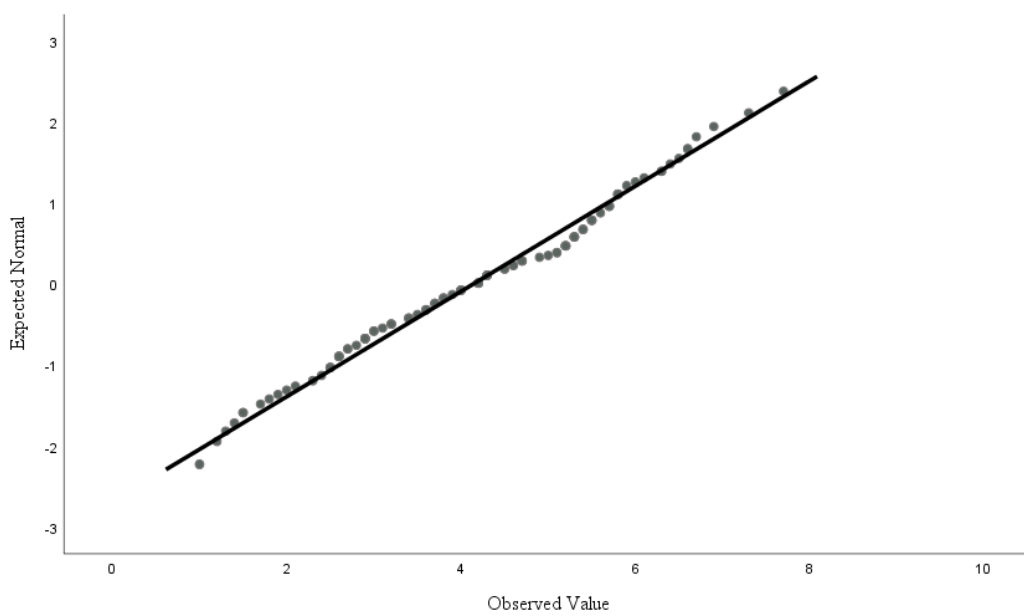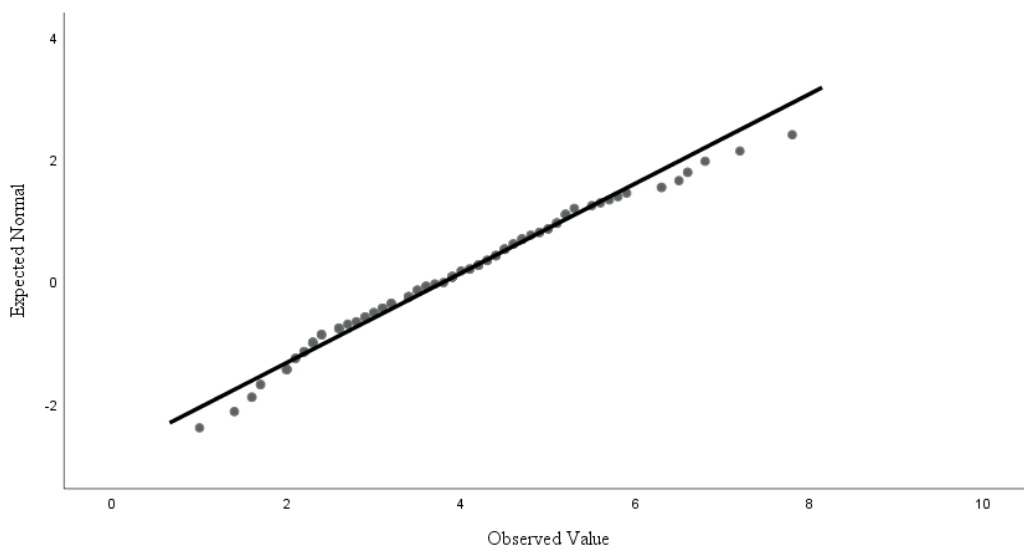
Figure 1.

Boxplot

Figure 2.

Normal Q-Q plots for each condition (educational, entertainment, control)
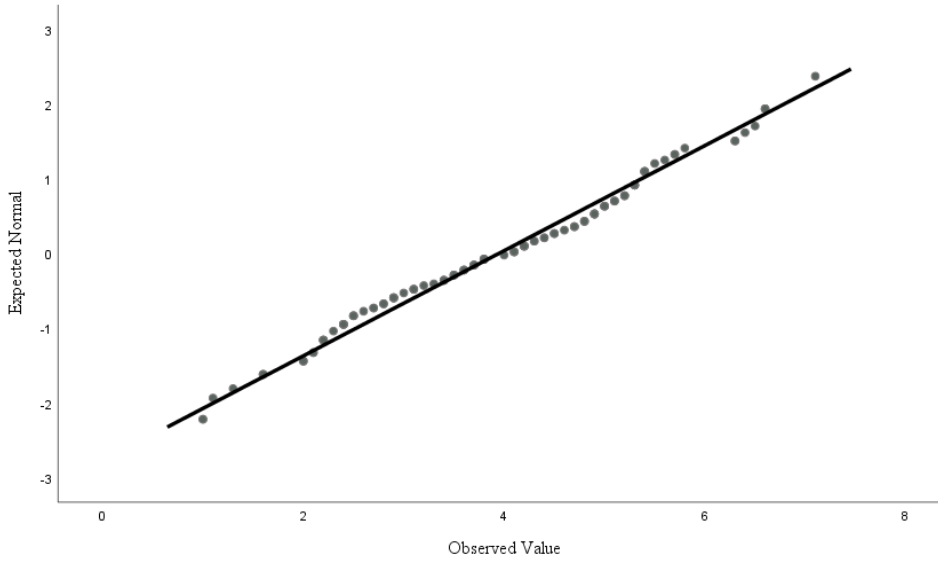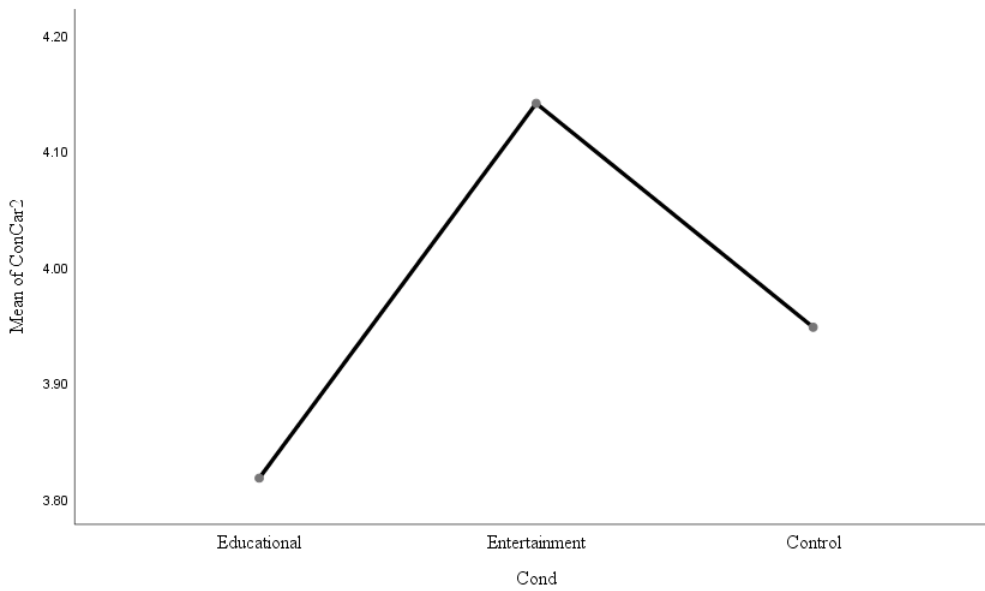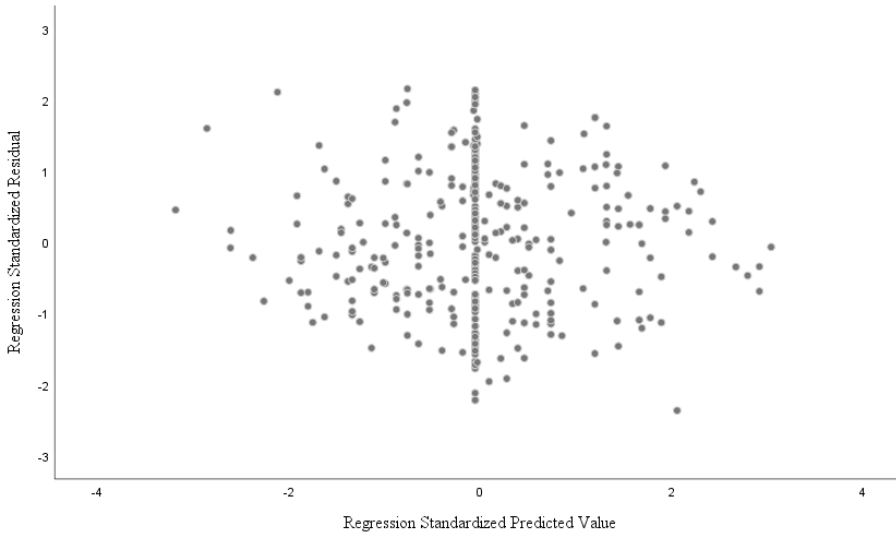
Figure 3.

Means plot

Figure 4.

Scatter Plot

Figure 5.

Normal P-P plot of residuals