Good Ethics Can't Stop Me From Exploiting: The Good and Bad of Anthropocentric Attitudes In Game Environment

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Abstract

In March 2020, People for the Ethical Treatment of Animals posted a guide for encouraging vegans to not Nintendo's critical-acclaimed Animal Crossing: New Horizon (ACNH). The blog post received many negative responses, one of which argued that those animals are not "real" and just out of moral consideration. Using 640 questionnaires of ACNH players, this article employed Bayesian analysis to examine how in-game behaviors reflect the extent to which players regards human as the

focus of their environmental standpoints. The results indicate the tendency of exploiting nature and non-human resources in-game environments regardless of the level of human-centeredness of players' environmental attitudes. While the frequency of in-game exploitation of insects and plants was associated negatively with the level of human-centeredness in environmental attitudes, the frequency of in-game fishing was positively correlated with human-centeredness. The findings suggest that game design plays a critical role in conditioning pro-environmental behaviors and highlights various difficulties to extend moral significance to all non-human beings.

Keyword: Anthropocentrism; environmental attitudes and behaviors; video game behaviors; Animal Crossing: New Horizon

1. Introduction

Man is a powerful creature on Earth. Many cultures believe that humans resemble the image of God. In the book of Genesis (1:26), humans were said to be created by God with their image to rule all other creatures on Earth. Greek gods and goddesses, who control many aspects of nature, possess many traits alike to humans (Lefkowitz, 2005; Steiner, 2005b). To some extent, these stories convey the aspiration of humans to rule over nature. The profound and irreversible impact of human on nature, such as biodiversity loss (Brodie, Williams, & Garner, 2021; Ceballos & Ehrlich, 2002; Newbold et al., 2015; Pimm & Askins, 1995; Raven & Wagner, 2021; Tilman et al., 2017), global warming and climate change (Burrell, Evans, & De Kauwe, 2020; Hansen & Stone, 2016) stemmed from anthropocentric beliefs, such as human dominion over nature. Environmental scientists have criticized anthropocentrism for rationalizing environmentally destructive behaviors (Fleck, 2001). For instance, anthropocentric attitudes promulgated by Judeo-Christianity were argued to lie at the root of our ecological crisis because such perspectives justify the exploitation of non-human creatures as a means to our ends (White, 1967). However, anthropocentrism is so deeply rooted in our worldviews that even non-anthropocentric rhetoric could hardly escape the shadow of anthropocentrism since one of its abilities is to distinguish humans from other non-human beings (Boddice, 2011). This paradox is a fundamental problem when considering how we should morally perceive and treat nature and non-human beings.

The challenges to consider nature and non-human beings morally have been more relevant recently with the immersion of virtual worlds. The subject was a game called Animal Crossing: New Horizon (ACNH), released in March 2020 and attracted nearly 20 million people in just nine months during the COVID-19 (Lane, 2021). In this game, players share a neighborhood with anthropomorphic characters and perform various activities such as terraforming, fishing, catching bugs, planting. As soon as the game was introduced to the market, the People for the Ethical

Treatment of Animals (PETA) organization issued a vegan guide to encourage game players not to catch fish and bugs in a game. They explained that these creatures should not be abused for trivial human purposes like entertainment or museum collection (PETA, 2020), despite not feeling any pain in the digital world. Their message to stop abusing virtual non-human animals received a mixed reaction from social media. Among waves of disagreements, the campaign was described as “a bizarre vegan guide” and “being too much even for vegans” (Gwilliam, 2020). On the other side, supporters argued that this game encourages animal abuse in real life (Gale, 2020). Even though being about a virtual world, this debate tackled how people should view their moral relations with digital nature and non-human creatures when assuming a role there.

This article took advantage of the game settings to investigate the association of human dominion beliefs with in-game environmental behaviors. ACNH is an open-world game, so players are not given any specific objective. They have a certain level of autonomy to create their own island and are free to choose whichever activities when spending time on the island (collecting items such as wood, fish, bugs, fruits; planting; socializing with virtual neighbors; visiting other islands; etc.). Some activities and their objectives highly resemble how humans exploit nature and non-human beings to satisfy their economic interests. After players collected items (i.e., fish and other aquatic animals, bugs, woods or natural resources, etc.), they could trade the collected items for money, use them to make tools or send them as gifts to museums and neighbors.

It should be noted that these activities are not required since there are other alternatives to achieve the same objectives, such as planting money trees to accumulate money and buy tools. This resemblance of the game to reality and the availability of alternatives makes it possible to use the game as an experiment to study the association between anthropocentric attitudes and environmental behaviors. By learning whether a human is the focus of their environmental ethics and how human-centeredness in worldviews influences how players interact with non-human contents, this paper gives empirical evidence about the fundamental struggles of how humans should give moral consideration to nature and non-human beings.

Using a database of 640 people playing ACNH, this paper employed Bayesian analysis to examine human interaction with flora and fauna in the game regarding their environmental perspectives. 640 game players from around 30 countries and regions worldwide were asked whether they agreed that humans were meant to rule the rest of nature and the frequency they carry out activities such as fishing, catching bugs, and cutting trees.

2. The moral paradoxes in environmental ethics

At the dawn of the environmental movement in the twentieth century, environmental ethics gained support. It emerged as a subfield of philosophy which deals with the moral relation of human to nature. It started with the early works of two of its founding fathers, Aldo Leopold and John Muir,

who called for a moral extension to nature and all animals and plants (Kortenkamp & Moore, 2001; Leopold, 2014). Their works initiated the debate between the advocates of anthropocentrism and the advocates of non-anthropocentrism. This debate, which is perhaps the most central one in the history of environmental ethics, has shown various paradoxes hidden behind the label of “anthropocentrism” and “non-anthropocentrism”.

First coined in the middle of the nineteenth century, anthropocentrism refers to human-centeredness in environmental ethical views (Campbell, 1983). In a strong sense, anthropocentric perspectives claim that humans are the only entities that are morally important or have intrinsic value while everything else is merely instrumental (their usefulness judges their values to humans) (Carter, 2007; Norton, 1994; Palmer, McShane, & Sandler, 2014). In a weak sense, anthropocentrism assigns a significantly higher level of intrinsic value or moral significance to humans than non-human beings, making it unproblematic to justify the latter’s sacrifice in return for humans’ benefits.

When environmental ethics emerged, anthropocentric-oriented religions and ideologies in the West were documented for rationalizing overexploiting and deteriorating nature, which embedded various scientific fields (Sessions, 1974; White, 1967). For example, the economics school of thought has strongly supported anthropocentric views, implicitly giving us the right to ignore ecological consequences (McMullen & Molling, 2015). Accompanied with economics and individualism rationales, anthropocentrism promotes the idea that the well-being of nature is peripheral to humanity’s well-being, encourages us to regard nature as a means to achieve economic progress (Bosselmann, 2010). As such, classical anthropocentric attitudes predominated in Western cultures (Sessions, 1974), such as those recognizing human as the supreme ruler of nature and its non-human members, was attacked for its role in causing ecological crisis (White, 1967) and its inadequacy to give moral consideration to nature and acknowledging the intrinsic values of non-human contents like trees (Diehm, 2008) and animals (Regan, 2004; Singer, 1995; Steiner, 2005a).

The defenders of enlightening anthropocentrism argued that the criticisms about anthropocentrism have ignored that human interest could be legitimate and illegitimate. Furthermore, from an anthropocentric standpoint, the wrongness of environmental behaviors is often recognized because of their adverse effects on human beings rather than for the sake of nature and non-human beings. Hence, the focus on human interests could effectively incentivize people not to deteriorate the quality of nature because it will eventually harm human well-being (Hoffman & Sandelands, 2005). Preventing deforestation to improve human’s living environment, not harming pollinators due to their ability to pollinate agricultural plants are typical examples representing anthropocentric rationales behind pro-environmental behaviors. Empirical research has supported the positive relationship between anthropocentrism and pro-environmental behaviors (Kaida & Kaida, 2016).

Also, it is not anthropocentrism that is bad, but some of its variants are. For example, speciesism, which refers to the difference in moral treatment, behaviors and attitudes towards a subject due to its membership to a certain species, is genuinely and ethically wrong (Hayward, 1997; Kopnina, Washington, Taylor, & J Piccolo, 2018).

Being put in dualism with anthropocentrism, non-anthropocentric environmentalism often refers to ecocentrism and biocentrism. The former claims that nature and non-human beings are morally significant because they have intrinsic value, regardless of human recognition of their usefulness. The latter extends morality only to living creatures (Samuelsson, 2013). Non-anthropocentrism is positively related to pro-environmental behaviors (Gagnon Thompson & Barton, 1994), but scholars have challenged the ontological commitment of non-anthropocentric ethics. They argue that non-anthropocentrism is still rooted in anthropocentrism since it still acknowledged the distinction between human and nature or non-human beings (Boddice, 2011). Non-anthropocentrism even earned the label of being a re-expression of anthropocentrism (Boddice, 2011; Gansmo Jakobsen, 2017) and is inadequate in environmental ethics than weak anthropocentrism (Norton, 1984).

The virtual environment has been the subject of various environmental behavior research. Environmental educational games are used to investigate the tendency to exploit the in-game resources and their relationship with players' environmental perception (Vuong et al., 2021). They are also found to support pro-environmental attitudes (Schaal, Otto, Schaal, & Lude, 2018). Yet, none has investigated how in-game behaviors reflect the extent to which players support anthropocentric viewpoints. This article focuses on the relationship between the level of human-centeredness in attitudes with environmental behaviors. This paper tackled the controversies of anthropocentrism by questioning how one's interaction with nature and non-humans reflects the strength of their belief in human dominion over nature. To achieve this goal, three questions were asked:

1. Do different levels of anthropocentric attitude correlate with different in-game environmental behaviors?
2. Does interaction with different species reflect different environmental perceptions of the players?
3. Do different ways to exploit trees reflect a different level of anthropocentrism in environmental views?

3. Methods and Materials

3.1. Materials

The current analysis employs a database of 640 ACNH game players from approximately 30 countries and regions worldwide. The database results from the survey conducted from 15th to 30th May 2020

and participated by various ACNH game players from multiple social networks, such as Facebook and Reddit, etc. The data collection process consisted of three steps to ensure the rigor of research methodology, the community standard's obligation, and respondents' rights.

First, a pilot test was conducted with 15 students in Japan, Singapore, the USA, and Vietnam playing ACNH. After completing the survey, all respondents were kindly requested to provide feedback on questions' appropriateness and check errors. Next, the authors contacted admins and the moderation team of ACNH communities for content validation and permission to post the questionnaire in the community. Lastly, the questionnaire was publicized with an explanation of its purpose and contents, as well as the admins/moderation teams' agreement for complying with the communities' rules and standards. Before starting the questionnaire, all respondents were required to read and agree with a consent form regarding their confidentiality, the handling of research data, and the disclosure of research outcomes.

Eventually, a total of 640 ACNH game players responded to the questionnaire. The majority of the respondents (55%) are from the USA and Canada, while the remaining 28.13%, 14.38%, and 2.50% of respondents are from Asia, Europe, and other countries (e.g., Argentina, Australia, and New Zealand), respectively. The age of respondents is relatively young, with an average of around 26.1. More female game players (64.38%) participated in the survey than their male counterparts (35.63%).

3.2. Bayesian multilevel model

For exploring the association between the resource exploiting behaviors of ACNH game players and their "human over nature" perception, we employ multilevel Bayesian analysis by implementing the **bayesvl** R package. The package offers a wide range of benefits when conducting Bayesian analysis, including flexible and intuitive model construction, graphical visualization of posterior diagnoses and results, and multilevel modeling alternative.

Given the fact that the sample-to-sample variability in the p -value of the frequentist approach is receiving more criticisms for causing the reproducibility crisis (Halsey, Curran-Everett, Vowler, & Drummond, 2015; Q. Vuong, 2020), Bayesian analysis has been proposed as a useful and effective alternative for frequentist approach across disciplines. Theoretically and pragmatically, the Bayesian approach acquires three main advantages. First, Bayesian analysis allows scientists to incorporate prior knowledge and restrict undesired factors through the prior function while keeping the inference of acquired observations (Wagenmakers et al., 2018). Second, integrating MCMC methodology's power, Bayesian analysis, offers scientists the flexibility and possibility to analyze a complex set of data that contains missing observations and multidimensional outcomes (Dunson, 2001). Bayesian analysis is not conditional on the asymptotic assumption, so its inference manners using small and large data sets are similar, enhancing Bayesian analysis's prediction accuracy when analyzing a small number of observations (Uusitalo, 2007).

Nonetheless, the multilevel model is employed in the current study instead of the conventional single-level model due to several reasons. Multilevel modeling has a natural fit with Bayesian analysis as it assigns probability distributions to the varying regression coefficients (Gelman & Hill, 2006). Moreover, the multilevel fitting model also helps improve the estimate for imbalance in sampling and study the variation among groups explicitly (McElreath, 2020). Partial pooling (or adaptive pooling) is another advantage of multilevel modeling. This kind of pooling enables us to produce less underfit estimates than complete pooling and overfit than no-pooling. In the current study, we employ *varying intercept* models, which are the simplest type of multilevel model, for exploring the relationship between in-game exploiting behaviors and perception towards game players' environment.

3.3. Model specification and variables

This sub-section describes the analyzed variables and how the model is specified and simulated using the MCMC method. There are seven variables comprised in the analysis (see Table 1).

Table 1: Outcome, predictor, and interaction variables

Variable type	Variable	Scale	Description	<i>Prior distribution</i>
Outcome variable	<i>Perception</i>	Strongly agree = 1 to strongly disagree = 5	The environmental perception level of a game player regarding anti-anthropocentrism	normal (0, 10)
Predictor variable	<i>Fishing</i>	Never = 1 to often = 4	The frequency that a game player goes fishing in ACNH	normal (0, 10)
Predictor variable	<i>CatchBug</i>	Never = 1 to often = 4	The frequency that a game player catches bugs in ACNH	normal (0, 10)
Interaction variable/Predictor variable	<i>TakeWood</i>	Never = 1 to often = 4	The frequency that a game player takes wood from	normal (0, 10)

			trees in ACNH	
Interaction variable	<i>CutTreeBi</i>	Yes = 1 and No = 0	Whether a game player frequently cuts down tree after taking wood or not	normal (0, 10)
Interaction variable	<i>TakeWood_CutTree</i>	<i>CutTreeBi</i> * <i>TakeWood</i>	The interaction between <i>TakeWood</i> and <i>CutTreeBi</i>	normal (0, 10)
Predictor variable	<i>Sex</i>	Male = 1 and Female = 0	The biological sex of a game player	normal (0, 10)

The measure of perception towards environment among game players is referred to as the item numbered 12th in the revised New Ecological Paradigm Scale (NEPS) by Dunlap et al. (2002). As the current study focus on the “human over nature” perception, all three items from the anti-anthropocentrism sub-scale of NEPS are eligible. Nonetheless, due to the low internal reliability of this sub-scale (Cronbach’s alpha = 0.56), we determine to select one of them as a representative. Eventually, the item “Humans were meant to rule over the rest of nature” is selected since this item exhibits the largest sense of human dominance.

For investigating the resource exploiting behaviors of game players in ACNH, the frequencies that a game player performs four following activities were asked: fishing, catching bugs, taking wood, and cutting down the tree. In ACNH, a player has to tap a tree at least three times to cut it down, so wood can be exploited without cutting down the tree. Therefore, the decision of whether to cut down the tree or not is worth exploring because it can directly link to the nature-destructive behavior of game players. For comparing the association of the behaviors exploiting wood with and without cutting down a tree, we create an interaction variable “*TakeWood_CutTree*” from two variables, “*CutTreeBi*” and “*TakeWood*”.

Performing a multilevel Bayesian analysis normally consists of three steps: model building, model fitting, and model interpretation and improvement. Here is the multilevel model constructed for predicting the associations between resource exploiting behaviors and “human over nature” perception of game players:

$$Perception \sim \alpha[Sex_{variant}] + Fishing + CatchBug + TakeWood + TakeWood_CutTree$$

where $\alpha[Sex_{varint}]$ is the varying intercept of the studied model. “Sex” is chosen as the higher level because of two reasons. First, behaviors are conditional on biological sexual characteristics. Second, the proportion of male and female respondents are not balanced, so estimating the prediction of biological sex for perception towards environment using a multilevel model can be more accurate and explicit. All prior distributions of the model’s coefficients are considered uninformative to reduce subjective bias since no prior studies in the vein have been conducted. The model is illustrated in Figure 1.

Figure 1: Regression model

As we utilize the **bayesvl** R package, which capitalizes the **Stan** package, the Hamiltonian Monte Carlo algorithm (HMC) and its extension, No-U-Turn Sampler (NUTS), are employed accordingly. The simulation uses four Markov chains, each containing 5,000 iterations with 2,000 of them for warmup. Lastly, the posterior coefficients of the model are diagnosed using trace plots and Gelman Shrink Factor plots. In contrast, the model’s goodness-of-fit is checked by applying the Pareto smoothed importance-sampling leave-one-out cross-validation (PSIS-LOO) (Vehtari, Gelman, & Gabry, 2017).

4. Results

4.1. Technical validation

Leave-one-out cross-validation (LOO) is a method for assessing a model’s generalization performance (Bernardo & Smith, 2009; Magnusson, Vehtari, Jonasson, & Andersen, 2020). However, the LOO estimate can be noisy when the importance weights distribution has a large or infinite variance (Peruggia, 1997). Pareto-smoothed importance sampling (PSIS) is used to improve the LOO

estimate (Vehtari et al., 2017). To check the PSIS estimate's reliability, we estimated the shape parameter k of the generalized Pareto distribution (Vehtari et al., 2017), which is plotted in Figure 2. $k < 0.5$ indicates that the convergence of the estimate is quick.

Figure 2: PSIS diagnostic plot

In what follows, the posterior coefficients of the multilevel model and diagnoses of their convergence are reported. The posterior results are presented in Table 2, with all coefficients' chains diagnosed to be well convergent. The Markov chains of a posterior coefficient are considered to be convergent when the coefficient's effective sample size is greater than 1000 ($n_{\text{eff}} > 1000$) and the Gelman Shrink Factor equals 1 ($R_{\text{hat}} = 1$). However, these metrics should only be used for detecting signals of danger but not signals of safety. Visually diagnosing the convergence using trace plots and Gelman Shrink Factor plots can help validate the results (McElreath, 2020; Vuong et al., 2020). Figure 3 shows the trace plots of all coefficients' Markov chains. Each plot illustrates the motion of four chains after the warmup period with 2000 iterations. The Markov chains in these plots are relatively healthy since they are stationary and well-mixing around the same values.

Figure 3: Trace plots of all coefficients

Figure 4: Gelman Factor Shrink plots of all coefficients

Another plot was visualized to diagnose the convergence, labeled the Gelman Shrink Factor plot (see Figure 4). The plot's vertical axis exhibits the shrink factor, the relative between-chain variance and within-chain variance, whereas the horizontal axis illustrates the number of iterations. It can be seen that the shrink factors of all coefficients swiftly drop to 1 before the 2000th iteration, which implies all chains are well convergent (Kruschke, 2014). PSIS-Loo is also performed to inspect model misspecification. All Pareto k estimates are below 0.5, the p_{loo} is smaller than the total number of parameters in the model, and the Monte Carlo Standard Error of elpd_{loo} is 0. These are the signals of a well-specified model (Vehtari et al., 2017).

Figure 5: Parameters' distribution

4.2. Main findings

In Table 2, the mean of “Sex[Female]” is greater than “Sex[Male]” ($\mu_{Sex[Female]} = 2.80$ and $\sigma_{Sex[Female]} = 0.29$; $\mu_{Sex[Male]} = 1.80$ and $\sigma_{Sex[Male]} = 0.29$). This result suggests that the environmental attitudes of male players are more anthropocentric-oriented than female ones. The mean of coefficients “CatchBug” is 0.27, which indicates a negative association between anthropocentric perception and the frequency of catching a bug. In contrast, higher frequency of in-game fishing increased the likelihood that players would support the idea of human dominion ($\mu_{Fishing} = -0.11$ and $\sigma_{Fishing} = 0.29$).

Table 2: Estimated posteriors of the relationship between perception towards the environment and the frequencies of exploiting behaviors

Predictor variables	Mean (μ)	Standard deviation (σ)	n_eff	Rhat
<i>Fishing</i>	-0.11	0.07	7342	1

<i>CatchBug</i>	0.27	0.07	7671	1
<i>TakeWood</i>	0.24	0.07	7696	1
<i>TakeWood_CutTree</i>	-0.09	0.03	7842	1
<i>Sex[Female]</i>	2.80	0.29	12763	1
<i>Sex[Male]</i>	1.80	0.29	12816	1
<i>Constant</i>	2.13	3.09	1547	1
<i>Sigma</i>	3.87	3.80	2857	1
<p><i>All Pareto k estimates are good ($k < 0.5$).</i></p> <p><i>The estimated effective number of parameters (p_{loo}) is 7.2.</i></p> <p><i>Monte Carlo Standard Error of the expected log predictive density ($elpd_{loo}$) is 0.0.</i></p>				

It is quite interesting that the game players' frequency of taking wood without interaction with "CutTree" behavior is positively correlated with their level of disagreement with "human over nature" perception ($\mu_{TakeWood} = 0.24$ and $\sigma_{TakeWood} = 0.07$), but when adding the interaction, the frequency becomes negatively associated with the disagreement level ($\mu_{TakeWood_CutTree} = -0.09$ and $\sigma_{TakeWood_CutTree} = 0.03$). The posterior density distributions of all exploiting behaviors are displayed in Figure. Among all the coefficients, the variance of "TakeWood_CutTree" is the lowest, highlighting the accuracy of this coefficient's simulation.

Figure 6: Density plot of coefficients regarding game players' resource exploiting behaviors

5. Discussion

This paper examines how game players interact and exploit natural resources in a virtual environment regarding how much they believe in human dominion over the rest of nature. Different species received different treatment in accordance with how anthropocentric players' environmental attitudes are. It is noteworthy that while going fishing more frequently increases the possibility that players will agree with the anthropocentric statement, catching bugs weakens the degree of agreement. Meanwhile, how game players acquire wood seems to be coherent with how much they believe that human rule over nature, individuals support human dominion tends to exploit wood and cut trees more. Finally, the result shows that both genders tend to disagree with human dominion; however, female players, on average, show stronger negative responses.

5.1. The good and bad of anthropocentrism in-game environment

In the game *Animal Crossing: New Horizons*, it was out of expectation that the frequency of catching fish and insects led to two opposite opinions when players were asked whether they agree that humans rule over others. The more frequently a person goes fishing in the game, the more he favors the idea of human dominion over non-human beings. Since the stronger agreement presents a higher level of human-centeredness in environmental ethics. It presents how much players do not believe that non-human have moral significance or have intrinsic value rather than instrumental value. Since fish have been exploited to serve various purposes of humans, such as eating or recreation for centuries (Policansky, 2002; Sahrhage & Lundbeck, 2012), their usefulness to humankind has proved

their instrumental value. Therefore, going fishing would increase the likelihood that players assign instrumental value rather than intrinsic value to non-human beings, thus show more favor to the idea of the human as the ruler of nature. Meanwhile, players who went fishing less frequently show weaker anthropocentric attitudes. It could be that players with weaker anthropocentric attitudes assign greater moral significance to non-human beings, which would constrain behaviors that are detrimental to other non-human beings' lives, even in a game environment where players are not bounded by ethics, morals, law, etc.

In contrast, the frequency of catching bugs in ACNH increased the likelihood that players have an anthropocentric attitude, despite those insects are also classified as animals like fish. How could individuals with weaker anthropocentric attitudes justify the moral of the act of catching insects like butterflies and bees? The reasoning might be based on speciesism in anthropocentric attitudes, regardless of how anthropocentric one is. While we feel ethically wrong when harming "developed" animals like fish, birds and cows, it is not the same when harming insects like bees, mosquitoes and spiders. Because we have strong reasons against killing animals whose ability to feel pain is known (e.g., fish, dog and cat), the reasons against painlessly killing are weak (Harman, 2011). Therefore, insects, whose sentience is still controversial (Fischer, 2016), received trivial moral consideration. Even if insects morally matter, the moral consideration we give them can't be parallel to animals like pigs and chickens (Fischer, 2016). Even people with weaker anthropocentric attitudes do not feel wrong when taking a trivial insect's life, even though they should be given moral significance as a sentient being (Lockwood, 1987). It implies how morally marginal insects are and how arbitrarily we give and do not give moral consideration to different non-human creatures based on their sentience, even though the exclusion from moral consideration based on the ability to feel pain is morally unjustifiable (Korsgaard et al., 1996; Singer, 2011).

Besides, on the one hand, anthropocentric rationales allow catching bugs for the sake of the human. The game portrays this aspect well. For example, players could catch fleas on the head of their anthropomorphic neighbor to help them to relieve itchiness. They could also catch bugs to make museum donations or sell them. On the other hand, anthropocentrism also encourages benign environmental attitudes towards beneficial ones (Hayward, 1997; Hoffman & Sandelands, 2005; Kopnina et al., 2018). Insects such as pollinators and those which are pleasing to the eyes might not be harmed, despite being sold for money. In other words, even individuals who strongly believe in anthropocentrism could exhibit pro-environmental behaviors to protect insects because of the benefits they bring to humans.

The game setting might condition those who catch bugs frequently to think that human is not superior to others. In the game, there are three types of bugs (tarantula, scorpion and wasps) that could attack players. Characters who are stung by these bugs will pass out and be sent home. Due to this unique feature, players who catch bugs frequently might understand that humans do not overpower

other creatures, while those who don't catch bugs frequently do not experience this effect. However, it is uncertain whether this feature has a substantial effect due to the frequency of players encountering these bugs. Compared to other kinds of insects, tarantula and scorpion are among the rarest ones to be seen. Wasps are common but only attack when being disturbed by players.

However, regardless of whether players agree that humans are meant to rule over the rest of nature, game players behave in ways showing a sense of superiority over other animals. Such a sense of superiority justifies negative and harmful acts to other inferior groups, catching for money or collection. It also hints at a paradox: Despite the extent to which humans focus on environmental attitudes, humans still exploit anyway.

5.2. Human and trees

This paper supports Bosselmann (2010) that people who believed in human dominion are associated with negative acts on trees. Especially when economic benefits accompany anthropocentrism, players are more likely to neglect the consequences. We found that players who support the anthropocentric perspective were more inclined to these behaviors even though they are less economical in the long term. In this game, to chop down trees, players need a qualified ax and hit the tree three times to chop it down. These trees will leave a stump and not grow back. By hitting once or twice, players will obtain woods falling from the tree without cutting it down. Trees can be planted but need three days to grow to their full size and at least three more days to grow fruits. Therefore, cutting down trees in this game is an act of overexploiting natural resources. It is uneconomical when times and effort to retain this resource back are taken into account.

In contrast, players, who refrain themselves from chopping down trees while exploiting the woods, are more likely to disagree that humans are meant to rule others. This suggests that less anthropocentric individuals tend to care more about long-term benefits and avoid overexploiting natural resources. Still, even though not chopping down trees reduces the likelihood to perceive humans as the ruler of nature, it should be noted that this act is not necessarily based on non-anthropocentrism ideas, in which nature and non-human beings are the focus of environmental ethics and attitudes. The presence of greater return in the future incentivizing the act of protecting resources (not chopping down trees) is based on anthropocentrism's moral rationales. From this perspective, when anthropocentrism is not taken too strongly and accompanied with an in-game condition to pay attention to future benefit, anthropocentric moral rationales could effectively promote pro-environmental behaviors.

6. Conclusion:

This article ends with several remarks after examining the association between in-game environmental behaviors and the level of human-centeredness in environmental attitudes. It tapped on the controversies regarding anthropocentrism in environmental views and supported previous research

that anthropocentrism could refer to a lack of intrinsic value and moral significance assigned to non-human beings and a strong concern over human benefits that lead to the sacrifice of non-humans. At the same time, with proper conditions, anthropocentric attitudes could be translated into pro-environmental behaviors for the sake of human benefits. However, regardless of how anthropocentric players' environmental attitudes are, they still exploit (Vuong et al., 2021), even though the game provides a favorable condition to exhibit pro-environmental behaviors. Therefore, we emphasized the limitations of anthropocentrism and non-anthropocentrism in encouraging pro-environmental attitudes and supporting a core cultural value focusing on environmental protection (Vuong, 2021).

We acknowledged the limitations of studying in-game behaviors and thus send caution if this paper's results are used to generalize environmental behaviors (Q.-H. Vuong, 2020). The ethical questions a person may ask when playing games can be radically different from reality. For example, a person feels unethical to kill another person in real life but may not feel the same way when killing the game characters of the opponents. However, the game situation is still a valuable experiment to study how pro-environmental attitudes and behaviors could be developed and nurtured (Vuong, 2018). Since the behaviors presented in this study are limited to the virtual world of ACNH, we recommend future research to expand to other environmental games. We include the environmental behaviors of humans to other non-human subjects.

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