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Examining the Relationship between Visitors Wildlife Value Orientation and Risk Perceptions: A study of the Borneo Pygmy Elephant in Sabah, Malaysian Borneo

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Abstract

Recently, there has been a growing interest in studying human-elephant conflicts; however, in the case of the Borneo Pygmy elephant, which has only been found in Sabah, Malaysian Borneo has not been thoroughly investigated. Recent studies shows the number of elephants killed as a result of human conflict is on the rise. This study intends to examine the relationship between visitor Wildlife Value orientation (domination and mutualism) towards Borneo Pygmy elephant risk perceptions. 401 survey data was collected from on-site visitors, and PLS-SEM analyses revealed that domination has a significant relationship with risk perception of Borneo Pygmy elephants. Mutualism, on the other hand, does not appear to be related to risk perceptions, according to the study. The findings are beneficial to policymakers in developing programmes that encourage visitors to view the endangered Borneo pygmy elephants in a more positive light, to reducing human-elephant conflicts.

Keywords: Wildlife Value Orientation, Risk perception, Domination, Mutualism elephant, Human elephant conflict

1. Introduction

The long-term survival of some of the most well-known animals in the world, such as elephants and tigers, is in grave danger as a result of human-wildlife conflict (HWC), and this danger is only growing worse. The term "human-animal conflict" refers to situations in which interactions between people and wildlife lead to unfavourable results for one party or the other, such as the destruction of property, the interruption of a person's means of subsistence and even life (World wildlife organization, n.d). The conflict analysis under the classic concept of human-wildlife conflict (HWC) does not take into account the involvement of humans, and the only concentrate on the animals involved (Frank et al., 2019). This is lead to the biased.

Peterson et al. (2010) stated that wild animals are not only capitalising on the events that are taking place; rather, they are actively aiming to cause harm to humans. To our knowledge, however, only humans are capable of harming or killing wild animals on purpose, as opposed to doing so in order to eat or survive. People are frequently motivated to engage in activities such as the killing of wildlife as a kind of response because they have the mistaken belief that wildlife constitutes a risk to human interests, such as by causing damage to crops and domestic animals or by putting people in danger (Hazzah et al.,2014). Human Wildlife Conflict is one of the most complex and pressing challenges facing wildlife preservation (Frank et al. 2019), particularly outside Protected areas, due to the fact that it is a reciprocal process (Woodroffe et al. 2005). Academics are looking for new approaches to refocus conflict research that is important to policy on coexistence and coadaptation between humans and other species (Carter & Linnell 2016).

Individual "problem" animals have traditionally been killed by management organisations and people in response to HWC (Kahler, 2015; Jorgensen et al., 1978). In many places, especially urban ones, this attitude of killing animal is today considered illegal or unacceptable (Sato, 2017; Liordos et al., 2017). Because of this, a range of non-lethal approaches have been explored by researchers (Liordos et al., 2017; O'Brien, 2019; Matseketsa et al., 2019). Techniques that focus on animals (e.g. animal conditioning, deterrents, repellents) may be used, while those that focus on compensating human victims (e.g. compensation programmes) may also be used (Sengupta & Radhakrishna, 2020; Johnson et al., 2018) When it comes to tackling HWC, both techniques have had varying degrees of success.

The human factor is at the center of the human-wildlife conflict (HWC). There are commonalities like conflict and the types of wildlife animals involved. Elephants are among the most common well-known wildlife animals, which has been involved in inter-conflicts with humans in recent years. Throughout the world, where there is a large population of elephants, there is a likelihood of human-wildlife conflict. A report by the World-Wide Fund for Nature (WWF) posits that fragmentation, loss of habitat, and expansion of human settlement are some of the main factors contributing to human-elephant conflicts (Freeman, Taff, Miller, Benfield & Newman, 2021). Elephants have been involved in some major human-wildlife conflicts in Malaysia. Bornean elephants (Elephas maximus borneensis) often known as the "Bornean elephant" are only found in Sabah, Malaysia, which is the country's major oil palm grower (Rubino, Serenari, Othman, Ancrenaz, Sarjono & Ahmad, 2021). As a result, Sabah has seen a rise in human-elephant conflicts (HECs) that have not been properly examined from a human aspects perspective. Recent data show that in 2019 twenty-four pygmy elephants were killed due to human conflict in the Malaysian state of Sabah.

Several scholars argue that snaring, poisoning, poaching, and illegal hunting are the main causes of conflict between humans and pygmy elephants in the Malaysia Sabah region. Although an accident can occur when human interaction with wildlife like pygmy elephants, a majority of death caused by humans to the animals is reiterate and deliberate killings. In such situations, people have rationalized their actions to kill or harm pygmy elephants due to encroachment, ground trampling, and crop destruction. In recent years, Sabah has experienced a surgeon in Borneo Pygmy elephant deaths in the region. In one situation, two plantation guards tasked with safeguarding and protecting Borneo Pygmy Elephants were found culpable of killing elephants using brutal means. Such brutal behavior towards wildlife, especially Borneo Pygmy Elephant, has created division among members of the communities in the regions, even those visiting to see the elephants.

Many day-to-day decisions are based on an individual's idea of how much they expose themselves to certain risks or conflicts. Unlike most researchers, people visiting or engaging with wildlife do not use risk assessment approaches or models to anticipate the consequences of HWC. Instead, people rely on intuitive judgments commonly referred to by experts as risk perceptions (Carter, Baeza & Magliocca, 2020). These are risks influenced by subjective judgments people make regarding the severity, likelihood, and characteristics of a given risk (Rundmo & Nordfjærn, 2017). This means that intuition, gut feeling, emotions, and past

experiences majorly determining how a person classifies subjective risks and risk perceptions (Xu, Cong, Wall & Yu, 2021). This means that risk perception can determine the level of HWCs.

Unlike risk perception, which uses subjective judgment to assess risks, Wildlife value orientation (WVO) relies on core values to gauge human-wildlife relations (Gamborg & Jensen, 2017). Researchers like (Cerri et al., 2017) emphasize the use of Wildlife value orientation (WVO) to explore patterns in HWC and predict behaviors of humans on wildlife. Wildlife value orientation (WVO) quantifies human behavior and informs of domination and mutualism. Domination represents the view of people who perceive wild animals as inferior to humans; hence such individuals are likely to use or support the use of force to subdue wildlife. In contrast, mutualism dictates that wildlife should be perceived with a human lens and treated with compassion (Freeman, Taff, Miller, Benfield & Newman, 2021).

The increasing number of HWCs involving the endangered elephants in the Sabah region call for alarm. Much of the reasoning conducted by studies on HWC cases in Malaysia is typically explained from either a Wildlife Value Orientation or risk perception perspective (Evans, Asner, & Goossens, 2018; KC, Min & Serenari, 2021). Essentially, some people justify the killings of Borneo Pygmy Elephants in the region as means to protect humans, while others view it as "murder." The nature of how various people perceive HWC is largely dependent on how they view the elephants (Wildlife value orientation (WVO) or based on their intrinsic subjective judgment (risk perception). This is because people's perception of the world of animals can dictate their behaviors when engaging or dealing with wild animals' life elephants. Risk perceptions are a critical aspect in preserving wildlife and reducing HWC while providing insight regarding how visitors behave or think. Understanding visitors' WVO relationship with risk perception regarding human-wildlife conflict can inform ways to be used to eradicate such problems.

At present, there is less study, especially in Malaysia, to examine the relationship between Wildlife Value Orientation and risk perception perspective in explaining HWC, thus demonstrating that there is an empirical gap for this study to fill. The study proposed its main research question as: *'What is the relationship between Wildlife Value Orientation and risk perception among visitors of Borneo Pygmy Elephant in Sabah, Malaysian Borneo?* The researchers chose to focus on Borneo Pygmy elephants because they are among the main wildlife animals involved in multiple HWC cases in the region. The research is imperative as it will provide supportive literature to show the diversity of Wildlife value orientation (WVO) among Malaysian visitors visiting Borneo Pygmy Elephant in Sukau Kinabatangan Sabah compared to their risk perceptions. The study's main objective is to examine the Relationship between Visitors' Wildlife Value Orientation of mutualism and domination towards Risk Perceptions among visitors of Borneo Pygmy Elephants in Sabah, Malaysian Borneo. The conceptual framework is presented below.

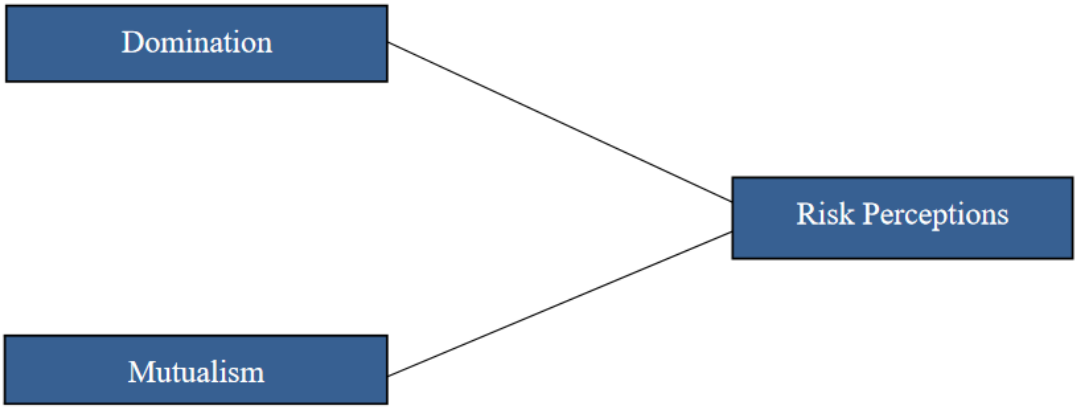

Figure 1. Research Framework

2. Literature Review

2.1 Wildlife Value Orientation (WVO)

Researchers assert that value orientation is an element of human cognitive hierarchy that dictates a person's behavioral intentions, norms, and attitude, among other values. Ideally, each society member harbors specific values that shape their identity as an individual (Keener-Eck, Morzillo & Christoffel, 2020). It is worth noting that these values can be similar or differ from one group of people to another. Coherently, value orientation provides meaning to abstract values that can be used to ascertain differences in behavior and attitude. This is because the strength of value orientation varies from one person to another. The concept of value orientation was used to develop a measurement tool to evaluate the fundamental beliefs regarding human-wildlife interactions. Kontsiotis, Triantafyllidis, Telidis, Eleftheriadou & Liordos (2021) state that the developers identified wildlife protection and use as the two dimensions of wildlife value orientation (WVO). Freeman, Taff, Miller, Benfield, & Newman (2021) argue that other researchers recognized mutualism and domination as the main basic constructs of wildlife value orientation (WVO).

Mutualism is based on the need to show social affiliation and care for wildlife, and domination is based on the need to dominate and hunt wildlife for human needs. People with wildlife value orientation dominion prioritize the interest of humans over wildlife, while those with wildlife value orientation mutualism show care and concern for wildlife events during conflicts. This means that people with a wildlife value orientation domination will show support for the use of force to counter wildlife when there is a conflict between humans and wildlife animals. However, wildlife value orientation mutualists are likely not to show support for such approaches.

2.2 Risk Perception

There are no sign theories that explain the phenomena of risk perception. People perceive risks via a combination of factors that are prevalent in their environment. It can be social,

cultural, economic, or political influences. The manner in which people perceive the risk of conflict with wildlife animals is based on their previous opinions, beliefs, or understanding. Having a high-risk perception means an individual has an increased level of bias and negative connotations towards HWC and vice versa (Xu, Cong, Wall & Yu, 2021). Numerous studies have examined the relationship between how people view risk and their response or view on wildlife. Some researchers have established that people who have grown up in communities that view animals as an important part of our ecosystem tend to have less attitude and assumptions that wild animals are threats or danger to people. Such an individual is likely to have a welcoming perception towards world animal (Mellor et al. 2020; Epanda, et al. 2019). Guenther & Shanahan (2020) points out that when assessing the benefits and risks associated with wildlife, people will use their subjective judgement or intuition to evaluate level of risks.

These methods of risk assessment are commonly referred to as "effect heuristics." It has been established by most researchers as the cognitive process employed by individuals in risk perceptions, useful in ascertaining what is viewed as risky or beneficial. Guenther & Shanahan (2020) explains that risk perception is not a static concept but rather relies on an individual past experiences and attitude with wild animals. This means that an individual's risk perceptive towards wildlife will largely depend on their past experiences and intrinsic attitudes towards. Thus, we conceptualise the hypotheses of the study as follows:

H1: Domination has positive effect on the Risk Perceptions of BPE.
H2: Mutualism has negative effect on the Risk Perceptions of BPE.

3. Methodology

As a purposive sampling strategy, we used quantitative methods and a non-probability sampling approach to gather data from the residents of Sukau, Kinabatangan, Sabah, Malaysian Borneo. It was one of Malaysia's conservation region to ensure that the study's respondents really represent the sample. Exogenous and internal variables are rated on a 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). Sample size is estimated using G*power 3.0 software by applying the effect size (f^2) of 0.15, (Faul et al., 2007); the chance of an α error probability 0.05; and the power of 0.95 with three tested predictors. This study necessitates a minimum sample size of 119. We sent out 500 surveys and received back 401 complete questionnaires that could be evaluated, which allowed us to conduct our research. Figure 1 depicts the four variables that will be studied in this study using SmartPLS 3.3.2 (Ringle et al., 2020), the study hypotheses were evaluated.

4. Analysis and Discussion

4.1 Participants Demographic Profile

Table 1 showed the demographic profile of participants of the study, which consist of 401 visitors. From the profile, 60.6% of the respondents is female and the rest is male. In term of Nationality, foreign visitor that came from different countries contributed 57.4% (230) from 401 respondents and Malaysian visitor contributed 42.6% (171). Meanwhile the age range of 36 to 40 years showed the highest percentage with of 32.9% (132), next was age between 31 to 35 years around 28.9% (116) visitor, the age between 41 to 45 years is 13.7% (55) visitor,

12.5% from age between 26 to 30 years and age between 20 to 25 years is the lowest percentage of 0.5% (2) visitor. The marital status showed that married contributed 53.9%, single around 37.7% and others category around 8.4% respectively. The result indicated that 232 (57.9%) visitor finish undergraduate, around 110 (27.4%) visitor received certificate, 44 (11%) visitor complete postgraduate and 15 (3.7%) visitors completed secondary school respectively. The respondent profile also indicated that 163 (40.6%) of the total respondent is government servant, around 144 (35.9%) is private staff, self-employed visitor around 66 (16.5%) and 22 (5.5%) visitors categorized under others employment type. The monthly income result showed that 141 (35.2%) of visitor's incomes was above MYR9000. Additionally, 117 (29.2%) visitors earn between MYR3000 to MYR 6000, around 85 (21.1%) visitors earn income below MYR3000 and 58 (14.5%) visitors earn between MYR6000 to MYR9000. The survey also asked whether the visitor has any membership in Non-Government Organization. The result showed 359 (89.5%) visitor is not a member and the rest is a member.

Table 1. Respondent Profile

	Variable	**Visitor (n = 401)**	
		Frequency	%
Gender	Male	158	39.4
	Female	243	60.6
Nationality	Foreign	230	57.4
	Local (Malaysian)	171	42.6
Age	< 20	8	4.5
	20-25	2	0.5
	26-30	50	12.5
	31-35	116	28.9
	36-40	132	32.9
	41-45	55	13.7
	46-50	20	5
	≥ 50	8	2
Marital status	Single	151	37.7
	Married	216	53.9
	Other	34	8.5
Education Level	Informal school	-	-
	Primary school	-	-
	Secondary school	15	3.7
	Certificate	110	27.4
	Undergraduate	232	57.9
	Postgraduate	44	11
Employment	Government staff	163	40.6
	Private staff	144	35.9

	Business/self employed	66	16.5
	Unemployed	6	1.5
	Others	22	5.5
Monthly Income	< RM3000	85	21.1
	RM3000-RM6000	117	29.2
	RM6001-RM9000	58	14.5
	> RM9000	141	35.2
Membership of NGO	Yes	42	10.5
	No	359	89.5

4.2 Assessment of Measurement Model

The construct reliability (CR) and convergent validity (CV) of the measurement model are first assessed, as shown in Table 2. In order to demonstrate the convergent validity, the variables under investigation were shown to have high internal consistency and a satisfactory average (Roldán & Sánchez-Franco, 2012) and variance extracted (AVE) (Hair et al., 2017). Indicators with loadings less than or equal to 0.708 have been retained for as long as an average value of zero ave of 0.500 has been obtained (Hair et al., 2017). Convergent validity was found to be sufficient for all of our constructs because the indicators explained at least half of the variance. Risk Perceptions had Cronbach's Alpha (CA) values of 0.999 and Composite Reliability (CR) values of 0.999, Domination had CA values of 0.940 and 0.953 (CR), and Mutualism had CA values of 0.8263 and 0.893 (CR), respectively.

Table 2. Measurement Model Assessment

Construct	**Item**	**Loadings**	**CA**	**CR**	**AVE**	**CV (Ave > 0.5)**
Domination	D1	0.874	0.940	0.953	0.770	Yes
	D2	0.913				
	D3	0.868				
	D4	0.845				
	D5	0.918				
	D6	0.845				
Mutualism	M1	0.821	0.863	0.893	0.546	Yes
	M2	0.813				
	M3	0.699				
	M4	0.638				
	M5	0.744				
	M6	0.704				
	M7	0.735				
Risk Perceptions	PR1	0.994	0.988	0.994	0.988	Yes
	PR2	0.994				

*No item was deleted as loading Composite Reliability > .708 (Hair et al., 2017)

The HTMT criterion is evaluated in Table 3 to determine discriminant validity (Ringle et al., 2020). Henseler's (2015) heterotrait-monotrait correlation ratio of correlations (HTMT0.90) was used as a criterion for discriminant validity (Gold, Malhotra, & Segars, 2001). Therefore, there is no issue with discriminant validity because the results show that the correlation values correspond to the corresponding constructs by meeting the usual HTMT criterion (HTMT.90). Structural model evaluation is appropriate because there is no issue of multicollinearity between indicators based on various constructs in the outer model.

Table 3. HTMT Criterion

	Domination	**Mutualism**	**Risk Perceptions**
Domination			
Mutualism	0.842		
Risk Perceptions	0.854	0.761	

Criteria: Discriminant validity is established at HTMT0.90 (Gold et al., 2001)

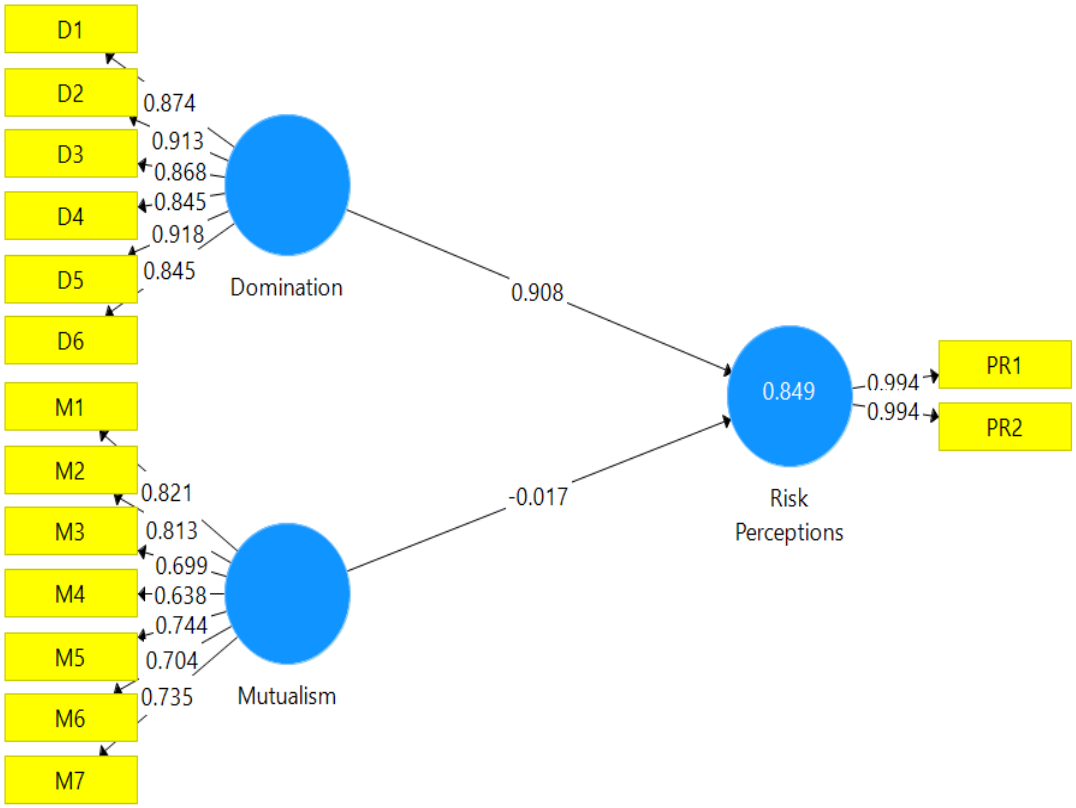

Figure 2. Measurement Model Assessment

4.3 Assessment of Structural Model

We next did a 5000-bootstrap resampling of the data to evaluate the hypotheses (Hair et al., 2017). According to Table 4, the Beta value for the route coefficient H_1 suggests that dominance has a favourable impact on BPE risk perceptions. The study specifically

supported H_1 (Domination → risk perceptions, = 0.908, p 0.0001, LLCI = 0.859, ULCI = 0.956). Mutualism has a negative effect on BPE Risk Perceptions, as evidenced by the Beta value for the path coefficient H_2. Nonetheless, we found no evidence for H_2 (Mutualism → risk perceptions, = -0.0.17, p > 0.000, LLCI = -0.075, ULCI = 0.040) because the p-value was not statistically significant. Both hypothesised associations (H_1-H_2) influence the risk perception of Borneo Pygmy elephants, as shown in Table 4, however only H_1 has a significant effect. Figure 3 shows a graphic representation of the structural model's evaluation.

Table 4. Path Coefficients

Direct Effect	Beta	S.E.	t-value	p-value	LLCI	ULCI	Decision
H1: Domination -> Risk Perceptions	0.908	0.029	30.820	0.000	0.859	0.956	Supported
H2: Mutualism -> Risk Perceptions	-0.017	0.035	0.486	0.314	-0.075	0.040	Not Supported

Note: *p<0.05, **p<0.01, Bias Corrected, LL=Lower Limit, UL=Upper Limit

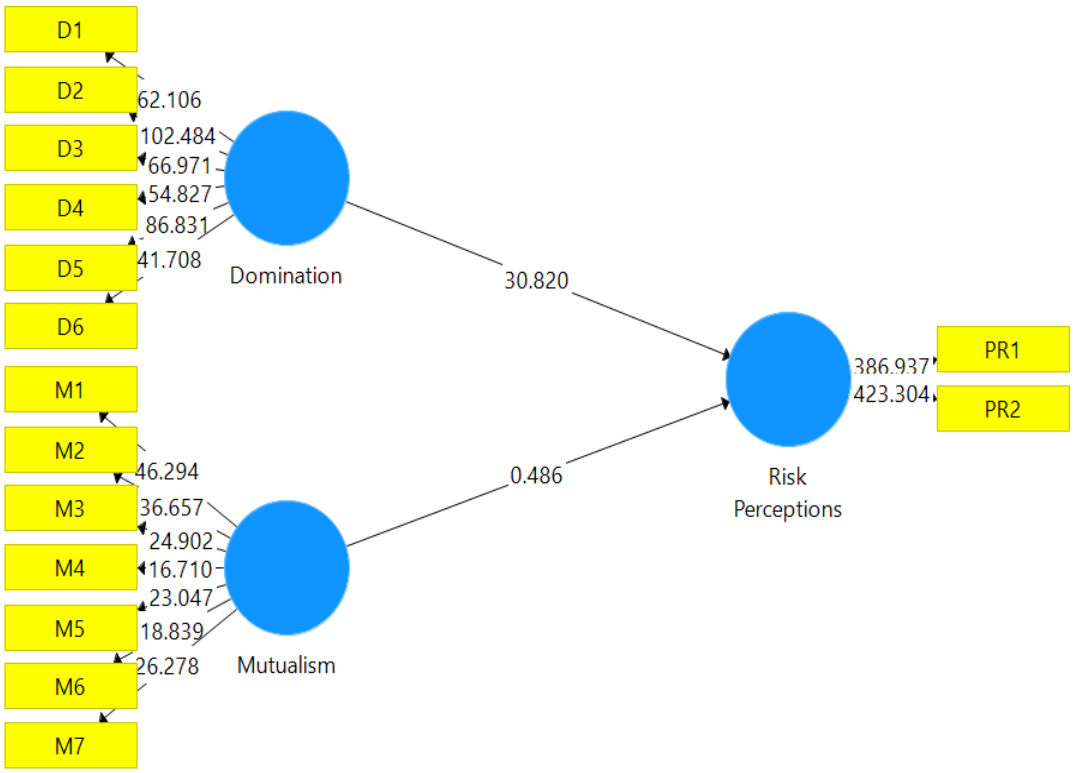

Figure 3. Structural Model Assessment

Table 5 displays the results of the model quality assessment. Exogenous factors' influence on the endogenous variable is initially measured in terms of effect size (f^2), coefficient of determination (R^2), and predictive importance (Q^2). The value of f^2 = 2.134 shows that domination has a large effect size f^2 on people's perceptions of the risk on BPE (Cohen, 1988).

This suggests that the idea of Domination has a considerable impact on people's perceptions of the risk of BPE. Mutualism and Domination's ability to reveal BPE risk perceptions is further explained by the R^2 coefficient of determination (Chin, 1998). There was a significant correlation between the two variables of Mutualism and Domination ($R^2 = 0.849$) in terms of risk perception.

Indicator multicollinearity was also assessed. The indicators met the VIF value and regularly fell below the 5.0 threshold (Hair et al., 2014). Thus, it can be inferred that collinearity issues did not reach the threshold values for both variables; thus, they are not an issue for the estimate of the path model. As indicated by the value of 0.834, Mutualism and Domination are deemed highly powerful at predicting risk perceptions of BPE among visitors that visit BPE in Sukau, Sabah, as presented by Q^2 using the blindfolding process, as indicated by the predictive relevance values (Hair et al., 2017).

Table 5. Model Quality Assessment

Direct Effect	**f^2**	**R^2**	**VIF**	**Q^2**
H1: Domination -> Risk Perceptions	2.134	0.849	2.561	0.834
H2: Mutualism -> Risk Perceptions	0.001		2.561	
Path Coefficient 0.01, 0.05 (Hair et al., 2017)				
$f^2 \geq 0.35$ consider Substantial (Cohen, 1988)				
$R^2 \geq 0.26$ consider Substantial (Cohen, 1989)				
Lateral Collinearity: VIF ≤ 3.3 (Diamantopoulos & Siguaw, 2006) or ≤ 5.0 (Hair et al., 2017)				
$Q^2 > 0.00$ consider large (Hair, 2017)				
$0.02 \leq Q^2 < 0.15$: weak predictive power				
$0.15 \leq Q^2 < 0.35$: moderate predictive power				
$Q^2 \geq 0.35$: strong predictive power				

The finding of the path coefficient indicates that there was a significant relationship between domination and risk perception among the sampled population. This means that an increase in Wildlife Value Orientation Domination increased risk perceptions among the visitors. Therefore, the first hypothesis has to be accepted the claim because the p-value is value 0.05 (Hair et al., 2017). The strength of the relationship is strong, as evident by the .000. Ideally, the lower the p-value towards zero, the high the strength of the relationship between the independent and dependent variables. The results show that among the sampled visitors, a majority were more dominant in their value orientations with corresponding elevated risk perceptions. This suggests that visitors engaged in human conflicts with wild animals like elephants are likely to react negatively or violently to Borneo Pygmy Elephant in Sukau Kinabatangan Sabah. Similarly, the results of the R2 show that Value Orientation domination had a high predictive power in support of risk perceptions. The results suggest that people with domination core values tend to have high-risk perceptions. The findings are consistent with Kontsiotis, Triantafyllidis, Telidis, Eleftheriadou & Liordos (2021), who noted that Wildlife Value Orientation Domination had a higher predictive power among people with

unfavorable opinions about handling wildlife during HWC.

In contrast, there was no significant relationship between Wildlife Value Orientation mutualism and risk perception. Hence the second hypothesis has been rejected. This means that among the sampled visitors, the level of perceived risk was not influenced by the view of elephants as compassionate animals. Essentially, it is possible for people to hold a mutualism ideology regarding wildlife without being influenced by their subjective judgment presented by risk perceptions when encounter the HWC. There are no sufficient or existing studies that have explored a similar relationship between H1: Domination -> Risk Perceptions; H2: Mutualism -> Risk Perceptions on Borneo Pygmy elephant.

Humans' attitudes and value orientations toward imperilled species, like the elephant, might be changed by their experience of approaching the species and vice versa. Emotions (Straka et al., 2020; Abidin et al., 2019), intents (Siemer et al., 2021; Straka et al., 2020), and ethics (Burns et al., 2017; Bruskotte et al., 2019) may also influence how strongly particular people maintain their values towards the species. Previous study has found that eliciting WVOs and beliefs in the context of wildlife preservation can assist decision-makers understand how rural people interact with and react to wildlife (e.g., Manohar et al., 2012; Needham, 2010; Serenari et al., 2015). In a conservation environment, understanding visitor's views toward wildlife is crucial. Because if WVOs are not matched with animal conservation goals as a result of the disagreement, the desired goals may not be met (Bright et al., 2000; Teel et al., 2010; Teel & Manfredo, 2010). Certain views toward wildlife may have either positive or negative repercussions for conservation development (Manohar et al., 2012). These findings could be used as a guideline for wildlife managers and stakeholders in Sukau to enhance cohabitation between human populations and Borneo Pygmy Elephants, particularly through the use of non-lethal management strategies.

5. Conclusion and Recommendation

The study has successfully examined and conceptualised the relationship between Wildlife Value Orientation (Domination) and risk perception in the context of visitors of Borneo Pygmy Elephants in the Malaysian Borneo context. Undertaking this study was important because it explained if Malaysian wildlife visitors have dominance/ Mutualism in their value orientation based on their risk perceptions. Essentially, the study shows the interaction between core values and subjective judgment that guides visitors' behavior when in conflict with wildlife. The study's managed to demonstrate that there is a partial relationship between Visitors' Wildlife Value Orientation and Risk Perceptions towards Borneo Pygmy Elephant in Sukau Kinabatangan Sabah.

There are several limitations should be acknowledged. First, the study has been undertaken in one specific region of Malaysia, thus, there is a need to undertake a similar study to incorporate visitors or participants from other regions across Malaysia with other wildlife species. This is important because people from diverse groups tend to have varying risk perceptions, dictating different Wildlife Value Orientation behaviors. Furthermore, future researchers can expound on the number of wildlife being investigated. This study only focused on Borneo Pygmy Elephant in Sukau Kinabatangan Sabah. By including other

wildlife can be possible to ascertain if the type of animal can influence Wildlife Value Orientation and risk perception. This is because it is a human tendency for people to like an animal more than others. Additionally, future researchers can explore the relationship between Wildlife Value Orientation and risk perception by factoring in other elements of WVO like Utilitarian and Pluralist, which had been excluded in this study. In addition, there is a limited study to examine the relationship between Visitors' Wildlife Value Orientation and Risk Perceptions either locally or internationally. This has made it difficult to make a comparative assessment with the results of this study.

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