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Equifinal paths to megafauna conservation through memorable wildlife tourism experiences: evidence from the restitution of the European bison (*Bison bonasus*) in Poland

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ABSTRACT

Despite a vast literature conceptualizing a memorable tourism experience, empirical studies overlook the context in which those experiences are produced and compiled into actions that benefit the environment. Accordingly, we need to better understand to what extent the experience of megafauna enclosures strengthens visitors' overall support for wildlife protection. To close this knowledge gap, we study memorable tourism experiences in the Bison enclosures within Poland to better understand the significance of the environmental context in which the experience induces support for protecting the species. To this end, the study employs both symmetric and asymmetric models to uncover the complexity of individual behavioural paths. The PLS-SEM results confirm the role of memorable experiences in the relationship between attitudinal and behavioural outcomes. In a complimentary manner, the fsQCA results reveal how environmental planners can analyze complex constellations of internal and external factors to elucidate the conditions that generate visitor support for wildlife protection.

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Wildlife tourism; context-dependent memory; support for wildlife conservation; PLS-SEM; fuzzy set qualitative comparative analysis

Introduction

Charismatic megafauna restoration areas have increasingly served as tourism 'experience escapes' (Ayazlar, 2017; Hall, 2019). Advocates of the inclusion of tourism activities in megafauna restoration projects highlight conservation benefits from increasing visitor support for wildlife protection (Packer & Ballantyne, 2012; Stronza et al., 2019). This perspective views the megafauna restoration enclosures as a unique environmental setting for visitors to learn through memorable tourism experiences (MTEs) (Skibins et al., 2013) – an 'experience positively remembered and recalled after the event has occurred' (Kim et al., 2012).

Despite a vast literature conceptualizing MTEs, empirical research tends to overlook the context in which MTEs are produced (Silverman, 1995; Volo, 2009). Instead, literature on MTEs focuses predominantly on revisiting intentions and positive word of mouth (e.g. Gohary et al., 2020; Kim & Chen, 2019; Akhshik et al., 2022). Other essential variables, such as visitor support for species protection, have been overlooked in MTE studies (Lee et al., 2015). Consequently, how experiences of charismatic megafauna enclosures contribute to visitors' overall support for wildlife protection in different contexts is not well understood (Esfandiar et al., 2022; Usui, 2021). To close this knowledge

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gap, we investigate *if* and *how* the context-dependent memories in the visitors' experiences of Bison in wildlife restoration enclosures translate into visitors support for Bison protection. The unique setting of Bison enclosures creates an opportunity to underline the situations in which the visitor experience bridges the attitudinal and behavioural outcomes of that experience.

To this end, we apply symmetric and asymmetric modelling approaches to the visitors' attitudes towards Bison protection (see Olya, 2020), uncovering the underlying essence of memorable experiences. First, we study a relationship between attitudinal factors to understand favourable outcomes of wildlife tourism experiences in the context of Bison encounters. This process is guided by the attitude-behaviour-context (A-B-C) theory of environmentally significant behaviour (Stern, 2000). However, while the A-B-C theory provides a necessary conceptual underpinning to setting in the relationship above, it may not be sufficient to comprehend diverse pathways between the memorable visitor experiences of wildlife and support for its protection. Consequently, the complexity paradigm offers a complementary perspective to the A-B-C theory. Namely, it defines situations when the heterogeneity of visitor experience *per capita* is coupled with each person's subjective and unique experience recall. Second, we apply asymmetrical modelling (Ragin, 2009). In this way, we facilitate system thinking that can assist in shaping the data-to-wisdom continuum (See Ackoff, 1989). Third, the holistic approach enables us to address the heterogeneous nature of human-wildlife interactions, and thus it advances knowledge critical to assessing tourism's role in supporting wildlife conservation projects.

Our study contributes to the theory by (1) extending the literature of MTE to include support for the protection of species, and (2) investigating A-B-C theory within the pillars of complexity framework. Furthermore, identifying the elements that influence support for the Bison protection may help administer the destination (Rezapouraghdam et al., 2021). Also, targeting only visitors' persona (Smit & Melissen, 2018), who embrace advantageous outcomes for the environment, may provide the prerequisites for securing social, environmental, or financial support for these vulnerable areas (Triantafillidou & Petala, 2016).

The theoretical underpinning of memorable wildlife tourism experiences

The innate heterogeneity of visitor perceptions (Ooi et al., 2018) has transformed the tourism research agenda to consider the subjectivity of tourism experience (Uriely, 2005). Kim and Ritchie (2014) developed a multidimensional measurement of memorable experiences for the tourism context. Dimensions of the memorable tourism experience construct (MTE) include the experiences of relaxation (refreshment), new phenomena (novelty), on-site activities (involvement), novel information (knowledge), pleasure (hedonism), and fulfilment (meaningfulness) (Kim et al., 2012). Many components of MTEs are strong enough to enter a long-term memory (Csikszentmihalyi & Csikzentmihaly, 1990, p. 3). Similarly, many factors that affect MTE depend on destination-related aspects such as the setting (Page et al., 2006). Thus, the atypical event, such as the encounter of charismatic restored megafauna, is more likely to be remembered (Ballantyne et al., 2011b; Curtin, 2010; Reder et al., 2002; Smith, 1988). Arguably, MTEs may be embraced as a new paradigm demonstrating the social-psychological impacts of tourism in wildlife restoration areas.

The enhanced attitudes of visitors experiencing captive and non-captive wildlife can positively impact visitor intentions to engage in pro-environmental behaviours (Ballantyne et al., 2009; Ballantyne et al., 2011a). Pyle (2003) suggests that visiting megafauna restoration enclosures can motivate conservation action because individuals become aware of environmental threats and show concern about biodiversity loss. For instance, negative experiences, such as viewing habitat loss, can provoke environmental activism (Chawla, 1999). More precisely, different types of wildlife experiences generate different types of engagement. The associated negative emotions regarding species' plight can foster a more robust commitment to conservation issues (Massingham et al., 2019). Thus, carefully designed, managed, and delivered tourism experience of restored megafauna can potentially

influence conservation knowledge, attitudes, and even visitor behaviour (Ballantyne & Packer, 2005; Ballantyne et al., 2007).

The complexity of memorable tourism experience

To address the bipolarity of intrinsic (internal) attitudinal features and extrinsic (contextual) features in predicting behaviours, Stern (2000) and Guagnano et al. (1995) proposed the attitude-behaviour-context (A-B-C) theory. A-B-C views behaviour as 'an interactive product of personal sphere attitudinal variables and contextual factors' (Stern, 2000). It suggests that a relationship between attitude-behaviour is always stronger in a weak context. In contrast, it is the weakest when the context is essential (Feldmann & Hamm, 2015). Hence, A-B-C proposes the significant and reinforcing effect of context in the attitude-behaviour link (Salonen & Åhlberg, 2012). Thus, contextual factors of the Bison experience matter because they foster conservation-focused behaviours, such as support for the reintroduction of Bison. Consequently, building on the A-B-C theory, we model the mediating role of memorable visitor experiences of Bison watching and how this experience relates to attitudes, perceptions of species reintroduction, and support for species protection (see Figure 1).

However, some scholars view the A-B-C theory as a 'means-end approach' with a focus on behaviour as the outcome (e.g. Feldmann & Hamm, 2015; Zhang et al., 2018), meaning that attitudinal or contextual antecedents may be necessary but not sufficient in leading to the desirable behaviour (Akhshik et al., 2021). Focusing on antecedents rather than the outcome may result in scholastic skepticism that diverts the research agenda towards a reductionist approach focused on identifying causes that are neither necessary nor sufficient when predicting the behavioural outcome. This reasoning aligns with the basic principles of the complexity paradigm (Woodside, 2014) – a holistic framework where the effect can be reached by many potential means (Woodside, 2014, 2016). According to Mackie (1965), the causes (such as contextual or attitudinal factors) are, at best, INUS conditions: Insufficient (because of the existence of various possible antecedents) but Necessary parts of a condition, which are themselves Unnecessary (because of the presence of possible differing conditions) but Sufficient to have an impact on the outcome. Therefore, addressing the shortcomings of A-B-C theory, which might be necessary but insufficient (Olya, 2020), adds complex modelling analysis and interpretation of the constructs that predict visitors' support for Bison protection. Asymmetrical and configural models were developed to complement the symmetric models' shortcomings (Figure 2).

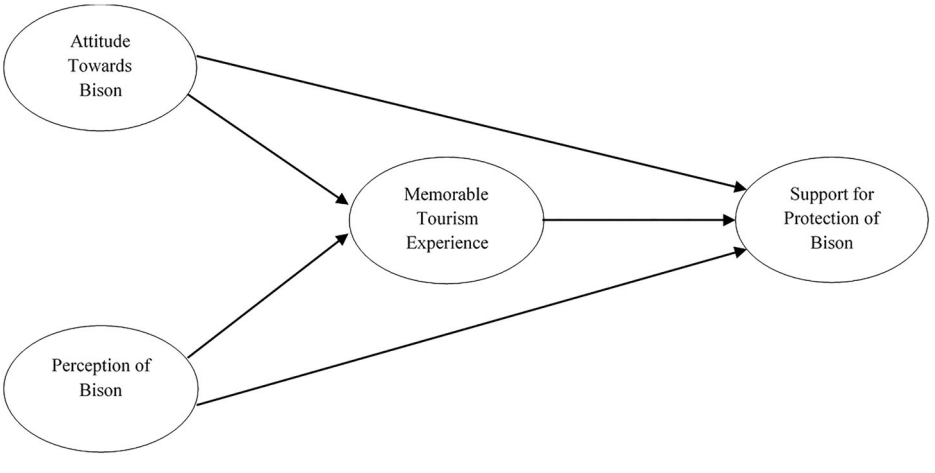


Figure 1. Symmetrical and structural model of the study.

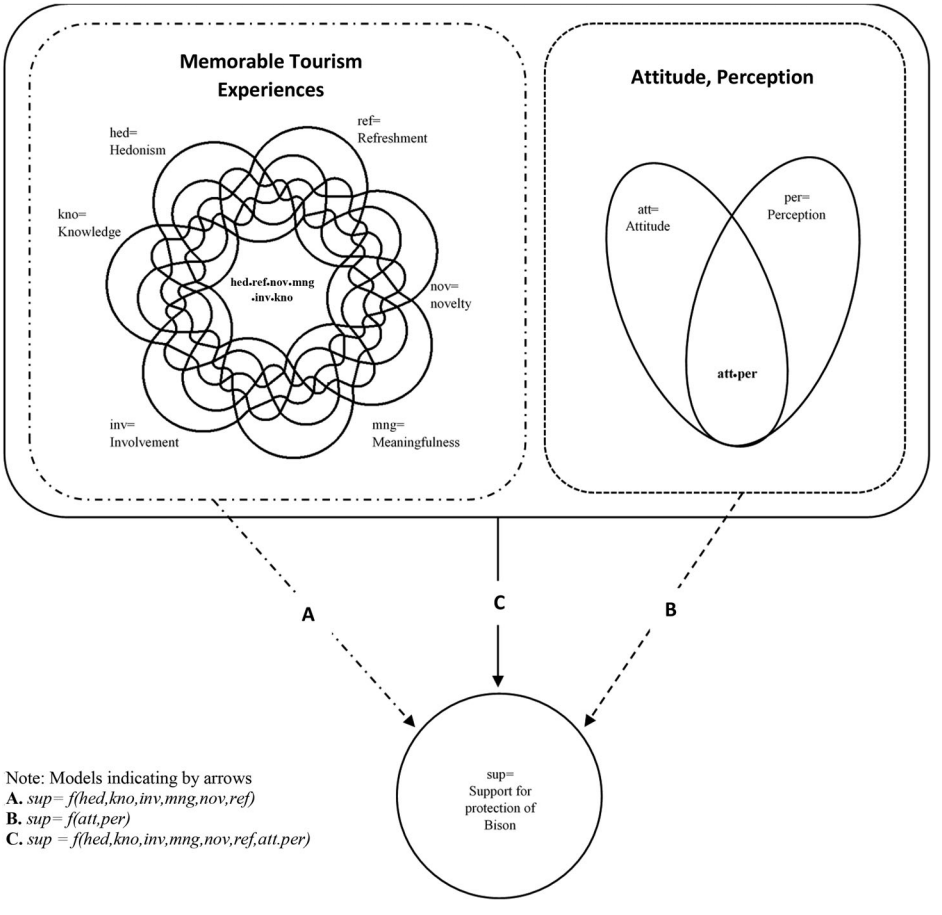


Figure 2. Asymmetrical and configurational model of the study.

Materials and methods

The context and study area

The European Bison (*Bison bonasus*) is the largest terrestrial European mammal and the last representative of European megafauna. Its history is one of the most successful stories of restoring a species that was facing extinction. The European Bison was nearly eradicated at the beginning of the twentieth century (in Poland, the last free-ranging Bison was eliminated in 1919). However, the entire European Bison population is the product of reproduction project started with the 12 individuals left in Europe. Approximately 26% of the world's bison population (out of ~8,500 individuals in the world) lives currently in Poland, mainly in free-ranging herds 2,048 individuals in 6 herds and 221 in 23 enclosures, at the end of 2019 (Raczyński & Bołbot, 2020).

Despite the successful establishment of free-ranging herds, the protection of Bison makes the Bison enclosures an essential factor in the bison restoration projects. Namely, the tasks of restoration areas include maintaining genetic variability, captive breeding (Pucek et al., 2004), and—last but not least—educating and providing opportunities to watch the Bison without disturbing free-ranging populations (Olech & Perzanowski, 2014). Of 23 bison enclosures, 9 are primarily dedicated to the European Bison (4 enclosures keep Bison as the only species, 5 enclosures use Bison as the main attraction), of which 4 operate in areas where free-ranging Bison have also been reintroduced (Appendix 1, Figure A.1). Almost all enclosures (but one) are popular tourism attractions, with visitors

increasing annually (over 100k). The study was conducted in 8 bison enclosures open to visitors located in Pszczyna, Jankowice, Muczne, Gołuchów, Międzyzdroje, Białowieża, Jabłonowo, and Wolisko, where Bison is the only or dominant species (Appendix 1, Figure A.2). All included enclosures were open visitors, and Bison was the primary species to experience. The enclosure area varied from 7 to 29 ha, and the oldest enclosure was established in 1929 and the newest in 2014. In the year of the study, each kept between 7 and 12 bison. Most of the enclosures have viewing platforms to facilitate wildlife watching; one requires that an interpreter accompanies the visit, but the others provide such services at particular times of the day or on-demand. Most enclosures are free of charge (5 out of 8), while others charge a small visitor fee (see Table A.1).

Study design

A systemic approach was employed throughout the research design. First, after conducting a review of the relevant literature, a Polish version of the questionnaire was constructed and validated using back-translation (McGorry, 2000). Next, a pilot study was conducted with 60 visitors to similar facilities, which allowed us to identify possible procedural issues, such as the timing of the questionnaire or the readability and clarity of the survey items; unclear items were removed from the final questionnaire. Moreover, procedural and statistical remedies were considered in the questionnaire design to reduce potential standard method biases (Podsakoff et al., 2003). In addition, theproximal and psychological separation of measurement items was applied, and the order of the questions was counterbalanced; evaluation apprehension was also considered. Finally, participants were reminded of anonymity and data confidentiality precautions and the project's purpose using a cover page.

In the following steps, the research team visited the study area during summer 2018 (from June to August, the high tourist season in Poland and bison enclosures) and spent two or three days at each enclosure (one working at least one weekend day). Relying on the convenience sampling method, researchers approached visitors during the post-visit phase to collect responses to a pen-and-paper questionnaire. This phase is believed to convey the most significant long-term behavioural change in animal-human interactional studies (Lück, 2015). All the respondents' answers were collected by researchers and *in situ*. The survey questionnaire was only distributed to adult visitors and took between 10 and 15 min to complete.

After data screening, 15 questionnaires were discarded due to missing values (> 5%), leaving 664 usable questionnaires. The age demography reveals that 18 (2.7%) of the respondents were below 18, while 98 (14.7%) were between 18-24, and 202 (30.4%) of them were between 25–34 years old. In addition, 212 (31.9%) respondents were between the age of 34–44 while 94 (14.1%) were between 45-54, 30 (4.5%) were between 55-64, and the rest (10 respondents – 1.5%) were above 65 years old. The mean replacement technique was used to address missing values (< 5%), and the application of this approach did not affect any of the variable means (Hair et al., 2010). In addition, the responses from early and subsequent versions of the questionnaires were compared to test for non-response bias (Armstrong & Overton, 1977). However, no significant differences ($p > .05$) were identified, suggesting that non-response bias was not a concern for this study.

Measurement scales

A series of well-established items derived from the literature were used to formulate the research questions. In this regard, we considered MTEs to be composed of hedonism (4 items), refreshment (4 items), meaningfulness (3 items), new knowledge (3 items), involvement (3 items), and novelty (4 items), following the comprehensive measure developed by Kim et al. (2012). This measurement instrument has been validated in different cultural settings and contexts (Kim & Ritchie, 2014). In addition, five items adapted from the conservation caring scale (Skibins et al., 2013) measured support for the conservation of Bison, while perceptions of the charismatic species were measured using six items defining bison characteristics that were adapted from Albert et al. (2018). Finally,

attitudes to the reintroduction of Bison were measured using eight items and were adapted from Decker et al. (2010) and Balčiauskas et al. (2017). Bison's cultural and historical meanings guided the final choice of items for the survey instrument in Poland and their fit with the context of the study, as identified through preliminary field observations and consultations with experts (i.e. bison conservation). This step was necessary as the concept of a flagship species is strongly associated with pre-existing, deep cultural framings, particularly in its relevance for conservation action (Jepson & Barua, 2015). All items were quantified on a 7-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). Further details and item descriptions are provided in Table 1.

Data analysis tools

After screening the data, testing the measurement model, and conducting an analysis of the psychometric properties, symmetric and asymmetric models were analyzed using (1) partial least squares structural equation modelling (PLS-SEM), (2) fuzzy set qualitative comparative analysis (fsQCA), and (3) necessary condition analysis (NCA). First, a bootstrapping technique was tested with 664 cases, and 5,000 subsamples were randomly generated (Hair et al., 2017). PLS-SEM has the power to handle conceptual models comprised of multiple indicators in the primary stages of theory building, especially when the model is complex or the data skewness and kurtosis are not ideal (Mardia, 1970). This method can also project the net effect of the relationships, such as the psychological properties of visitors, onto the model outcome (i.e. support for the protection of Bison (Dijkstra & Henseler, 2015)).

However, recent studies on tourist behaviour argue human behaviour demands complex modelling (Akhshik et al., 2021) because predictors and outcomes are not necessarily symmetrically associated (Olya, 2020; Olya et al., 2018; Taheri et al., 2020). For example, cross-tabulation offers insights into the innate complexity of behavioural outcomes, including their relationship in predicting antecedents and correlations. Hence, asymmetrical modelling using fsQCA and NCA complements the outcomes of PLS-SEM. fsQCA requires that interval or ratio scale variables be transformed into fuzzy set membership values (from 0.05 as non–membership, 0.5 as cross-over point, and 0.95 as full membership) in data calibration (Ragin, 2008). Then, fsQCA determines the sufficient causal combination of antecedents that leads to high or low scores with truth table by judging based on two probabilistic criteria of coverage and consistency, which are calculated using the following formulas:

$$\text{Consistency: } (X_i \leq Y_i) = \frac{\sum\{min(X_i,\ Y_i)\}}{\sum X_i}$$

The formulas indicate case i's membership score in sets X and Y as X_i and Y_i respectively (Ragin, 2009). Threshold values of 0.8 and 1 are the generally accepted criteria for consistency and coverage, respectively. NCA is then used to detect the single antecedents necessary to achieve an intended outcome (Dul, 2016).

Results and discussion

Results of the preliminary tests

The normality of the data was assessed based on skewness and kurtosis values; these fell within the acceptable range of ± 3 and ± 10, respectively, with a low standard deviation. Some items' slight deviation in kurtosis was addressed using bias-corrected and accelerated (BCa) bootstrapping and, therefore, may not represent a major violation of the assumptions (Hair et al., 2017; Henseler et al., 2015).

We followed the guidelines of Hair et al. (2017) to assess the measurement model and further evaluate the structural model. First, we examined the indicators' loadings greater than the recommended value of 0.7 (Table 1). Next, we assessed the internal consistency reliability using

Table 1. Item loadings, construct reliability, validity, descriptive statistics.

Constructs & Items	Loading	VIF	AVE	CR	α	ρA	Mean	SD
Hedonism *(*Kim & Ritchie, 2014*)*			**0.72**	**0.91**	**0.87**	**0.91**	**5.75**	**1.15**
Hed1. Thrilled about watching Bison	0.88	2.70						
Hed2. Indulged in watching Bison	0.87	2.47						
Hed3. Really enjoyed Bison watching experience	0.82	2.01						
Hed4. Watching Bison was exciting	0.83	1.91						
Involvement *(*Kim & Ritchie, 2014*)*			**0.65**	**0.85**	**0.74**	**0.75**	**5.55**	**1.21**
Inv1. I visited a place where I really wanted to go	0.81	1.63						
Inv2. I enjoyed activities which I really wanted to do	0.80	1.63						
Inv3. I was interested in the main activities of watching Bison	0.81	1.33						
Knowledge *(*Kim & Ritchie, 2014*)*			**0.77**	**0.91**	**0.85**	**0.85**	**4.94**	**1.39**
Kno1. Exploratory	0.84	1.73						
Kno2. Knowledge	0.91	2.88						
Kno3. New culture	0.88	2.55						
Meaningfulness *(*Kim & Ritchie, 2014*)*			**0.79**	**0.92**	**0.87**	**0.89**	**4.13**	**1.66**
Mng1. I did something meaningful	0.85	2.13						
Mng2. I did something important	0.94	3.19						
Mng3. Learned about myself	0.87	2.34						
Novelty *(*Kim & Ritchie, 2014*)*			**0.74**	**0.89**	**0.82**	**0.82**	**4.74**	**1.51**
Nov2. Unique	0.83	1.73						
Nov3. Different from previous experiences	0.90	2.04						
Nov4. Experienced something new	0.83	1.88						
Refreshment *(*Kim & Ritchie, 2014*)*			**0.74**	**0.91**	**0.88**	**0.88**	**4.15**	**1.59**
Ref1. Liberating	0.83	2.03						
Ref2. Enjoyed the sense of freedom	0.82	1.98						
Ref3. Refreshing	0.87	2.80						
Ref4. Revitalized	0.90	3.24						
Support for protection/conservation of Bison *(*Skibins et al., 2013*)*			**0.62**	**0.86**	**0.79**	**0.81**	**5.60**	**1.15**
Sup2.I would feel bad if Bison becomes extinct	0.67	1.38						
Sup3 I would protest if I learned Bison is treated badly	0.83	1.89						
Sup4 I am ready to change my lifestyle to support Bison conservation	0.81	1.75						
Sup5 Bison protection should be one priority of the Polish society	0.82	1.72						
Perception of Bison as flagship species *(*Albert et al., 2018*)*			**0.55**	**0.88**	**0.84**	**0.84**	**6.43**	**0.74**
Per1 Reveals the power of nature	0.79	2.00						
Per2 Interesting	0.70	1.51						
Per3 Respectful	0.74	1.74						
Per4 Impressive	0.79	1.99						
Per5 Symbol of polish nature	0.74	1.91						
Per6 King of polish forest	0.70	1.70						
Attitudes to rewilding of the Bison *(*Balčiauskas et al., 2017*;* Decker et al., 2010*)*			**0.59**	**0.92**	**0.90**	**0.90**	**6.41**	**0.77**
Att1 I believe we need to support the reintroduction of Bison in areas It used to live	0.75	3.16						
Att2 I support the reintroduction of Bison, and I would like it to be an essential aspect of nature protection in Poland	0.84	4.26						
Att3 Poland should be a country that reintroduces Bison population (living free)	0.82	2.86						
Att4 Polish government should support the wild population of Bison.	0.82	2.38						
Att5 Bison should be strictly protected by law in Poland	0.70	1.72						
Att6 Bison should live free in Poland	0.70	1.85						
Att7 Number of wild Bison in Poland should increase	0.80	2.48						
Att8 it is worth introducing Bison species to new areas	0.68	1.55						

Note: ρA: Dijkstra-Henseler's rho; α: Cronbach's Alphal; CR: Composite Reliability; AVE: Average Variance Extracted; VIF: Variance Inflation Factor.

composite reliability, where values between 0.7 and 0.9 are considered 'satisfactory to good' (Jöreskog, 1971; Table 1). Cronbach's alpha (α) was also above the commonly accepted value of 0.7 for all constructs. Moreover, as an alternative to providing evidence for a correct factor model, ρA > 0.7 was also achieved (Dijkstra & Henseler, 2015; Table 1). Finally, variance inflation factors (VIFs) were

Table 2. Discriminant validity, Fornell-larcker criterion.

	1	2	3	4	5	6	7	8	9
(1) Attitude	**0.77**								
(2) Hedonism	0.33	**0.85**							
(3) Involvement	0.34	0.74	**0.81**						
(4) Knowledge	0.30	0.60	0.73	**0.88**					
(5) Meaningfulness	0.18	0.59	0.64	0.72	**0.89**				
(6) Novelty	0.20	0.69	0.68	0.65	0.74	**0.86**			
(7) Perception	0.38	0.40	0.49	0.40	0.26	0.29	**0.75**		
(8) Refreshment	0.20	0.64	0.63	0.71	0.81	0.75	0.26	**0.86**	
(9) Support	0.34	0.50	0.64	0.78	0.55	0.51	0.46	0.52	**0.79**

Note: The non-diagonal elements are the latent correlations, while the diagonal elements (in bold) are the square roots of the Average Variance Extracted (AVE)

examined (Table 1), which provides further evidence for the lack of collinearity among the constructs (Mason & Perreault, 1991).

The third step in assessing the measurement model examined issues related to convergent validity using the average variance extracted (AVE) (Table 1) All constructs met the validity criteria of AVE > .50 (Hair et al., 2017). Finally, we assessed discriminant validity (Table 2) using the Fornell and Larcker (1981) assessment, which compares each construct's AVE to the squared inter-construct correlation.

Assessment of the structural model

To assess the structural model, path coefficients and statistical significance, among other recommended concerns such as inter-construct relationships, were evaluated using the R^2 values of the endogenous variables and the standardized root mean squared residual (SRMR) (Mikalef & Pateli, 2017). Consequently, the model's prediction is relevant as all the R^2 values for endogenous mediating constructs exceeded 0.26, and the value for the outcome construct reached 0.63. In addition, Stone-Geisser's Q^2 values were greater than zero for each construct (Hair et al., 2017). Each construct's indirect effect on support via one or more intervening constructs of MTEs is presented in Table 3. This effect type is most appropriate in evaluating mediating effects (Nitzl, 2016). As a result of parallel mediation, mixed partial and full mediating roles of MTE dimensions have affected the relationship between attitude and perception and its influence on support for bison conservation.

Results of the cross-tabulation analyses

Further examination of the symmetrical relationships reveals the existence of contrarian cases in the dataset. Contrarian cases run counter to the main effect in symmetrical analysis and signify the shortcomings of conventional methods in approaching the data. Table 4 provides an example of the heterogeneous nature of support for the protection of Bison and its relationship with meaningfulness. There were 144 cases (21.6% of the sample) that did not associate any meaning with the tour yet supported the protection of Bison. This result is contradictory to both the main net effect and our

Table 3. Testing the mediating effect.

Path	Path coefficient	Std. Deviation	t-value	*p*-value	Decision
Total Indirect effect					-
Attitude → Support	0.129	0.130	4.129	0.000	-
Perception → Support	0.252	0.035	7.092	0.000	-
Direct effect					
Attitude → Support	0.066	0.028	2.315	0.021	Partial Mediation
Perception → Support	0.139	0.041	3.366	0.001	Partial Mediation

Table 4. Cross-Tabulation Analysis of Support for protection of Bison with Meaningfulness.

Meaningfulness		Support for protection of Bison							Total
		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree	
Strongly Disagree	Count	2	8	13	18	18	13	1	73
	% within Meaningfulness	2.7%	11.0%	17.8%	24.7%	24.7%	17.8%	1.4%	100.0%
	% of Total	0.3%	1.2%	2.0%	2.7%	2.7%	2.0%	0.2%	11.0%
Disagree	Count	3	2	14	22	21	12	2	76
	% within Meaningfulness	3.9%	2.6%	18.4%	28.9%	27.6%	15.8%	2.6%	100.0%
	% of Total	0.5%	0.3%	2.1%	3.3%	3.2%	1.8%	0.3%	11.4%
Somewhat Disagree	Count	0	1	6	23	33	38	6	107
	% within Meaningfulness	0.0%	0.9%	5.6%	21.5%	30.8%	35.5%	5.6%	100.0%
	% of Total	0.0%	0.2%	0.9%	3.5%	5.0%	5.7%	0.9%	16.1%
Neutral	Count	0	0	5	30	61	60	13	169
	% within Meaningfulness	0.0%	0.0%	3.0%	17.8%	36.1%	35.5%	7.7%	100.0%
	% of Total	0.0%	0.0%	0.8%	4.5%	9.2%	9.0%	2.0%	25.5%
Somewhat Agree	Count	0	0	2	7	35	63	12	119
	% within Meaningfulness	0.0%	0.0%	1.7%	5.9%	29.4%	52.9%	10.1%	100.0%
	% of Total	0.0%	0.0%	0.3%	1.1%	5.3%	9.5%	1.8%	17.9%
Agree	Count	0	0	0	1	12	46	23	82
	% within Meaningfulness	0.0%	0.0%	0.0%	1.2%	14.6%	56.1%	28.0%	100.0%
	% of Total	0.0%	0.0%	0.0%	0.2%	1.8%	6.9%	3.5%	12.3%
Strongly Agree	Count	0	0	0	2	1	13	22	38
	% within Meaningfulness	0.0%	0.0%	0.0%	5.3%	2.6%	34.2%	57.9%	100.0%
	% of Total	0.0%	0.0%	0.0%	0.3%	0.2%	2.0%	3.3%	5.7%
Total	Count	5	11	40	103	181	245	79	664
	% within Meaningfulness	0.8%	1.7%	6.0%	15.5%	27.3%	36.9%	11.9%	100.0%
	% of Total	0.8%	1.7%	6.0%	15.5%	27.3%	36.9%	11.9%	100.0%

Note: Cramer's V = .277, phi = .679, $p < 0.000$ indicating correlation between variables; Marked area indicates 144 (21.6% of the sample) negative contrarian cases indicating ~Meaningfulness → Support for protection of Bison.

Table 5. Configural Models of high and low scores of support for protection of Bison (model A, B and their negations).

A. sup = f(hed, kno, inv, mng, nov, ref)				**~A.** ~sup = f(hed, kno, inv, mng, nov, ref)			
Models for predicting high score of sup	RC	UC	C	Models for predicting low score of sup	RC	UC	C
~mng*~nov*~ref	.35	.019	.87	~mng * hed * ~nov * ref * ~inv * ~kno	.53	.07	.86
~mng*~ref*inv	.41	.002	.94	~mng * ~hed * nov * ~ref * inv * ~kno	.52	.07	.85
hed*~ref*inv	.46	.004	.95				
hed*nov*inv	.75	.022	.96				
hed*inv*kno	.30	.042	.98	solution coverage: .60			
				solution consistency: .83			
~mng*hed*~ref*~kno	.20	.002	.92				
~mng*hed*~nov*~inv*~kno	.56	.000	.94				
mng*nov*ref*inv*kno	.56	.001	.99				
solution coverage: .91							
solution consistency: .92							
B. sup = f(att, per)				**~B.** ~ sup = f(att, per)			
Models for predicting high score of sup	**RC**	**UC**	**C**	**Models for predicting low score of sup**	**RC**	**UC**	**C**
att	.98	.01	.86	att * ~per	.42	.09	.90
per	.98	.01	.86	~att*per	.41	.07	.86
solution coverage: .99				solution coverage: .50			
solution consistency: .84				solution consistency: .83			

Note: RC: raw coverage; C: consistency; UC: unique coverage; *: and; ~: negation; hed: Hedonism; kno: Knowledge; inv: Involvement; mng: Meaningfulness; nov: Novelty; ref: Refreshment; att: attitude; per: perception; sup: support for protection of Bison.

Table 6. Configural Models of high and low scores of all the antecedents and the outcome (Model C and its negation).

C. sup = f(hed, kno, inv, mng, nov, ref, att, per)	RC	UC	C
Models for predicting high scores Sup			
M1. hed*~ref*inv*att*per	.45	.01	.95
M2. hed*inv*kno*att*per	.79	.08	.98
M3. ~mng*~nov*~ref*~kno*att*per	.27	.01	.90
M4. ~mng*hed*~ref*~kno*att*per	.30	.00	.93
M5. ~mng*hed*~nov*~ref*att*per	.32	.00	.94
M6. ~mng*~nov*~ref*inv*att*per	.32	.00	.95
M7. mng*hed*nov*inv*att*per	.61	.00	.98
solution coverage: .88			
solution consistency: .94			
~C. ~ sup = f(hed, kno, inv, mng, nov, ref, att, per)	**RC**	**UC**	**C**
Models for predicting low scores Sup			
M1. hed*~ref*inv*att*per	.81	.00	.45
M2. hed*inv*kno*att*per	.75	.00	.25
M3. ~mng*~nov*~ref*~kno*att*per	.80	.03	.70
M4. ~mng*hed*~ref*~kno*att*per	.80	.00	.67
M5. ~mng*hed*~nov*~ref*att*per	.77	.00	.60
M6. ~mng*~nov*~ref*inv*att*per	.74	.00	.59
M7. mng*hed*nov*inv*att*per	.66	.00	.28
solution coverage: .94			
solution consistency: .27			

Note: RC: raw coverage; C: consistency; UC: unique coverage; ~: negation; hed: Hedonism; kno: Knowledge; inv: Involvement; mng: Meaningfulness; nov: Novelty; ref: Refreshment; att: attitude; per: perception; sup: support for protection of Bison.

expectations. Henceforth, modelling multiple realities through configural analysis is encouraged (Woodside, 2015).

fsQCA uses the Quine-McCluskey matrix to determine the various recipes that lead to high and low scores regarding support for Bison's protection (Woodside, 2017). The configural and asymmetrical models (Figure 2) are detailed in Tables 5 and 6. Arrow A (Figure 2) highlights the recipes derived from the dimensions of MTEs to predict support for the protection of reintroduced Bison

(SUP). Both high (A) and low (∼A) scores of SUP are reported in Table 5. To clarify with an example, the first model (A.M1) predicts that those visitors who scored low on meaningfulness, novelty, and refreshment scored higher on SUP.

On the contrary, ∼A.M1 suggests that visitors who lacked meaningfulness, novelty, involvement, and knowledge but scored higher on hedonism were not supportive of the protection of Bison. Therefore, contrary to the assumptions of the conventional and symmetrical approaches, the factors predictive of a low SUP score are not necessarily the mirror opposites of those predictive of a high SUP score. Yet, fsQCA facilitates the crafting of different recipes to negate the same outcome. More such combinations regarding Arrow B in Figure 2 [peb = f(at, per)] and its negation (∼B) are outlined in Table 5. B.M1 and M2 suggest that attitude or perception alone can result in a high SUP score, but ∼B.M1 shows that attitude combined with a lack of perception or perception together with a lack of attitude can result in low SUP scores.

Based on the results for the combination of all antecedents [*f(hed, kno, inv, mng, nov, ref, att, per)*], seven recipes were identified that encourage visitors to support the protection of Bison (Table 6). C.A:M1 (hed*∼ref*inv*att*per) suggests that visitors with high scores in hedonism, involvement, attitude, and perception and who lacked refreshment scored higher with regards to supporting the protection of Bison. Meanwhile, model C.A:M3 (∼mng*∼nov*∼ref*∼kno*att*per) highlights those visitors who lacked meaningfulness, novelty, refreshment, and knowledge, but displayed a better attitude and perception, also scored highly on the protection of Bison. This finding contradicts the results of previous studies that have primarily documented the positive effect of knowledge on support for environmental protection. However, this may largely be due to the misinterpretation of symmetric models used in conventional methods. Additional recipes for both low and high SUP scores are presented in Table 6.

Results of the NCA

Unlike sufficient conditions, single necessary antecedents are essential components without which the outcome will not occur (Dul, 2016). Table 7 presents critical antecedents identified as the results of the necessary-condition-analysis (NCA). A cut-off consistency level of .90 was used to select the necessary conditions (Olya & Al-ansi, 2018). From this, hedonism, involvement, attitude, and perception were identified as the single necessary conditions without which support for the protection of Bison will not occur. Therefore, highlighting the strategies that encourage these necessary antecedents should be a priority in the tourism management of these valuable sites.

Predictive validity

To predict future outcomes and to test the out-of-sample *ex-ante* power of the recipes, we conducted a test for predictive validity, as suggested in previous studies (e.g. Ferguson et al., 2018). First, the sample data were divided into a subsample and holdout sample. Next, the fuzzy XY plot was displayed separately for one of the recipes (Table 8. C:M2. Sup = hed*inv*kno*att*per) in the

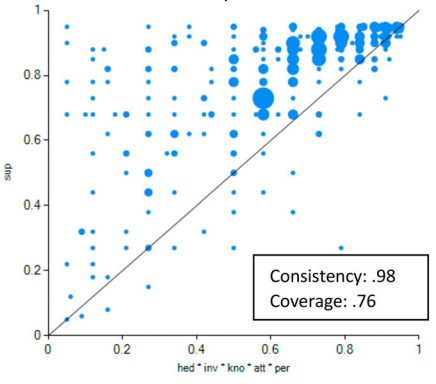
Table 7. Results of Necessary Condition Analysis.

Antecedent Condition	Consistency	Coverage
Meaningfulness	0.656	0.979
Hedonism	0.932	0.909
Novelty	0.776	0.958
Refreshment	0.656	0.976
Involvement	0.921	0.934
Knowledge	0.839	0.982
Attitude	0.981	0.862
Perception	0.987	0.865

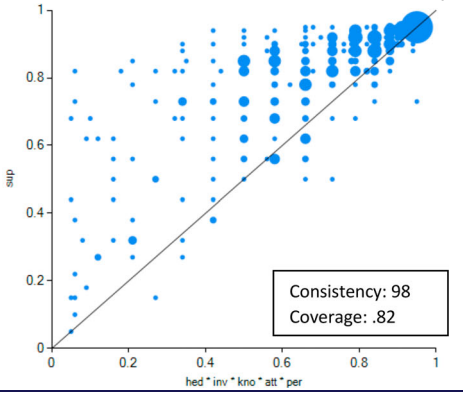
Table 8. Evidence of predictive validity on two subsamples.

Configural model: C: M2. hed*inv*kno*att*per	Raw coverage	Consistency
Original Sample	.79	.98
Subsample I	.76	.98
Subsample II	.82	.98

Test of the M2 with subsample



Test of the same model with subsample II



Note: The fuzzy XY plot unveils the asymmetric relationship of the causal model and provides the predictive validity of the model.

subsample and the holdout sample. Finally, the model's predictive validity was quantified by comparing the consistency and coverage of the original sample, subsample, and holdout sample.

Discussion and conclusion

Guided by the A-B-C within the complexity paradigm, the study determined *if* and *how* the context of megafauna enclosures links different components of visitor wildlife experiences to their support for Bison protection. The results of symmetrical modelling evaluated that environmental context matters in that it shapes the relationship between perceptions of and support for Bison protection by creating conditions for the memorable visitor experiences (i.e. MTEs). While the A-B-C theory highlights the importance of designing memorable experiences of restored megafauna, a complimentary framework of complexity theory addressed shortcomings of the conventional approach and the corresponding linear modelling. Namely, we evaluated data in relation to the context in which it has been collected (Woodside, 2017). Hence, following the complexity paradigm, we calculated a complex behavioural path recipe to explain high and low scores for visitor support of Bison protection.

The main recipe (path) that predicts the outcome is never itself necessary, as multiple paths can be followed to achieve identical high or low scores supporting Bison's protection. In other words, many fsQCA solutions can guide theory development as to how to reach the desired outcome in visitor support for Bison protection. Accordingly, seven of the models generated through fsQCA (Table 6) predict the favourable outcome of support for the reintroduction of Bison. Furthermore, these results suggest two effective strategies to manage tourism in Bison enclosures. The first solution recommends to focus on marketing segmentation by looking into the profile of the visitors, while the second can target a certain necessary condition to calibrate visitors' experiences that contributes to the meaning-making paradigm (Routledge et al., 2012).

An important message to take away from this study is that the memorable experiences of megafauna restoration enclosures can foster positive changes in visitors' beliefs and attitudes about wildlife; Furthermore, such unique experiences may affect visitors' support for the protection of the megafauna, especially when combined within the frameworks of complexity (please see Appendix

A.2). To facilitate support for Bison protection, the experience must focus on promoting hedonism, intense involvement, a positive attitude towards rewilding bison, and perception of Bison as the flagship species. In other words, Bison context potentially facilitates educational entertainment where visitors can personally contribute to the conservation and have a change to appreciate such an action during the visit (even in a limited or symbolic scope). Meaningfulness of the visiting experience may lay in linking emotional rewards from taking action with recognition of importance the species.

Theoretical and practical implications

The application of complexity theory and the investigation of the symmetric and asymmetric aspects of the phenomena replace reductionism with a holistic approach that offers many clear implications for theory development (Olya, 2020). Each analytical tool provides compelling yet distinct insight into the concept of support for Bison protection. At the same time, each step of the research process enables a deeper understanding of the phenomena, 'turning the data into wisdom' (Ackoff, 1989).

Apart from the methodological contribution to theory development, our study explores the effect of memorable experiences in wildlife encounters by identifying behavioural paths towards visitors' support for megafauna protection. Increasing public support for protecting megafauna is a substantial yet sometimes overlooked impact of tourism experiences created around wildlife restoration projects (Strzelecka et al., 2022). We show how and when the tourism experiences contribute to this important conservation goal and illustrate that wildlife tourism must be seen and evaluated in a broader context of global nature protection efforts.

While, findings from previous research reflect that different dimensions of tourism experience affect travellers differently at the post-experience stage (e.g. Kim & Ritchie, 2014; Triantafillidou & Petala, 2016), these results differ depending on the context in which MTEs happen. By developing a configural model using fuzzy set qualitative comparative analysis (fsQCA), we responded to the call for investigating the idea of a memorable tourism experience (MTE) in various contexts, such as nature-based activities (Esfandiar et al., 2022). We also show that each context is unique in that it triggers different components of MTE to affect attitudes towards Bison. The result highlights the necessity to conceptualize processes through which various components of MTE may influence visitor behaviours.

Several aspects of bison enclosures make this context suitable for studies linking wildlife experiences and support for wildlife protection. First, as a form of alternative tourism, nature-based travel is an ecologically sensitive phenomenon that can boost pro-environmental behaviours such as support for the protection of species (Chan et al., 2017); Because of its multi-beneficial goals and practical significance, nature-based tourism has received increasing attention recently (Zhang et al., 2020). Thirdly, these areas are precious for preserving biodiversity, tourism, ecosystem services, and economic benefits for locals. Nevertheless, despite what was mentioned above and unlike the increased demand for this type of tourism (Strzelecka et al., 2022), limited literature is available about studying the influential recipes that simultaneously influence travellers' experience and pro-environmental behaviours.

The practical implications of this study are twofold. First, decision-makers may take advantage of tourism opportunities that bring the most leverage and value to protected megafauna through the self-enhancement of visitors. In this sense, visiting Bison enclosures should provide tourists with a sense of care and the importance of protecting wildlife beyond the enclosures. Second, practitioners can design experiences to gain visitors' support for wildlife conservation, including reintroduction projects. Experience of visiting bison enclosure can enhance visitors' understanding of the unique need of the reintroduced species and let them connect with the animal in a more emotional way.

As NCA revealed, hedonism, involvement, attitude, and perception are necessary for enhancing visitors' support for Bison protection; designers of the visitor experience in Bison enclosures

should ensure that visitors actively engage with wildlife during a trip they deeply enjoy. This is more than the current packages offered in Poland's bison enclosures, which focus on providing passive wildlife watching and information about the species. While bison enclosures underline the importance of educating about the proper human behaviour while wildlife encounters, especially including safe distances to the animals in the wild, tourism managers should actively engage tourists during their visit without disturbing the bison or interacting with it as with the domesticated animals. In contrast, wildlife enclosures must engage visitors emotionally through guided active learning tours about the species or 'actual' conservation tasks. Providing visitors with opportunities to contribute to species conservation by organizing 'fun,' yet meaningful wildlife interactions or elaborating interpretative approaches that expose visitors to a broader context of the Bison reintroduction project struggles to protect the species, and the biological and cultural significance of Bison in Europe.

Limitations and suggestions for future studies

The study participants were limited to visitors of Bison encounters in Poland. Future studies could include participants from other destinations and different species in terms of their protection status or cultural and symbolic meanings. In addition, the study was limited to include other demographic information such as gender, education, cultural background. The inclusion of these factors could result in more exact estimations of the predicting models based on the demography of the respondents.

Moreover, testing the influences of other variables, such as destination image, destination familiarity, and social responsibility motives, may result in new insights for recognizing different paths that lead to desirable outcomes. Finally, as we focused on the visitors' side, future research can benefit from capturing different views from various stakeholders, in a wider context of human-wildlife coexistence and conflict management.

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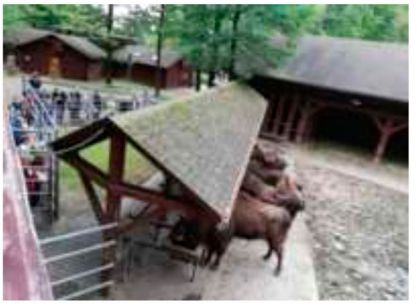
Table A.1. Characteristic of bison enclosures in the study

	Jankowice	Jabłonowo	Wolisko	Muczne	Gołuchów	Międzyzdroje	Białowieża	Pszczyna
Location	At the edge of a nature reserve	Next to a national road, in open area, forest nearby	At the edge of the forest	At the edge of the forest, approx. 2km from the a village	Inside a large park, next to a Museum of Natural History	Inside a forest in Woliński National Park, approx. 2 km from the town	At the edge of the forest, approx. 3 km to the village	Inside a large park in town of Pszczyna
Area	10 ha	14 ha	7 ha	7 ha	19,5 ha	28 ha	28 ha	10 ha (separated in two enclosures)
Year of establishment	2006	2014	1956	1963	1977	1976	1929	1865
Number of bison	6	7	7	12	9	9	19	6
Management institution	State Forestry Holding	State Forestry Holding	NGO	State Forestry Holding	State Forestry Holding-educational unit	National park	National park	Local association
Tourist infrastructure	Viewing platform, information boards, educational offer available on demand	Viewing platform, all visit accompanied by an interpreter, possibility to feed the Bison by tourists	Viewing platform	Viewing platforms, guided tour on demand, interpreter available for all groups at specified hours	Viewing platform	Viewing platform	Viewing platform. guided tour on demand	Viewing platform, wide range of educational activities
Other animals in the facility	No	The Eurasian lynx	No	No	Polish primitive horse, fallow deer, wildboar	Roe-deer, wildboar, , white-tailed eagle, red deer	Polish primitive horse, moos, red deer, roe-deer, wildboar, żubroń (hybrid of domestic cattle and Bison), wolf	Muflony, red deer, fallow deer, roe-deer, few bird species
Free ranging Bison in vicinity	No	Yes	Yes	Yes	No	No	Yes	No
Entry tickets	No	Yes	Yes	No	No	Yes	Yes	Yes

Complexity Theory Evaluation

The study developed and tested symmetric and asymmetric models justified by complexity theory (Woodside, 2014). Complexity theory addresses the shortcomings in reductionism approach therefore, facilitates theory crafting, model development, data analysis and interpretation as a whole. It assumes that the outcome is not the 'sum of its parts' as it focuses on how the parts fits and interact to produce an outcome. To evaluate the empirical data with the tenets of complexity theory, Woodside (2017) highlights the importance of the context vis-à-vis the data. Accordingly, a single antecedent is rarely sufficient to predict the intended outcome (Tenet 1). It means that a complex recipe explains high/low outcomes scores (Tenet 2: The recipe principle). Based on the results of this study, the combination of the variables listed in table 5 and 6 resulted in the high/low support for protection of bisons. However, the recipe that predicts the outcome is not necessary itself, as there are many other recipes that lead to the same outcome (Tenet 3: Equifinality principle). Therefore, as

a) Pszczyna

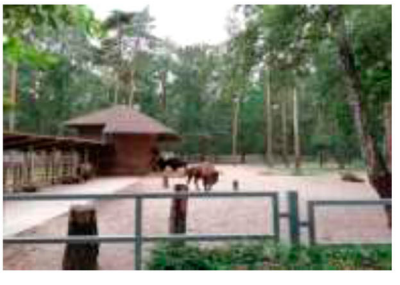


b) Jankowice

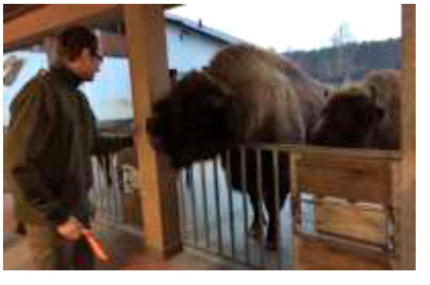
c) Międzyzdroje

d) Wolisko

e) Gołuchów



f) Jabłonowo



g) Muczne

g) Białowieża

Figure A. 1.#Photo Documentation of Bison exposition to tourists in the studies enclosures (source: Authors).

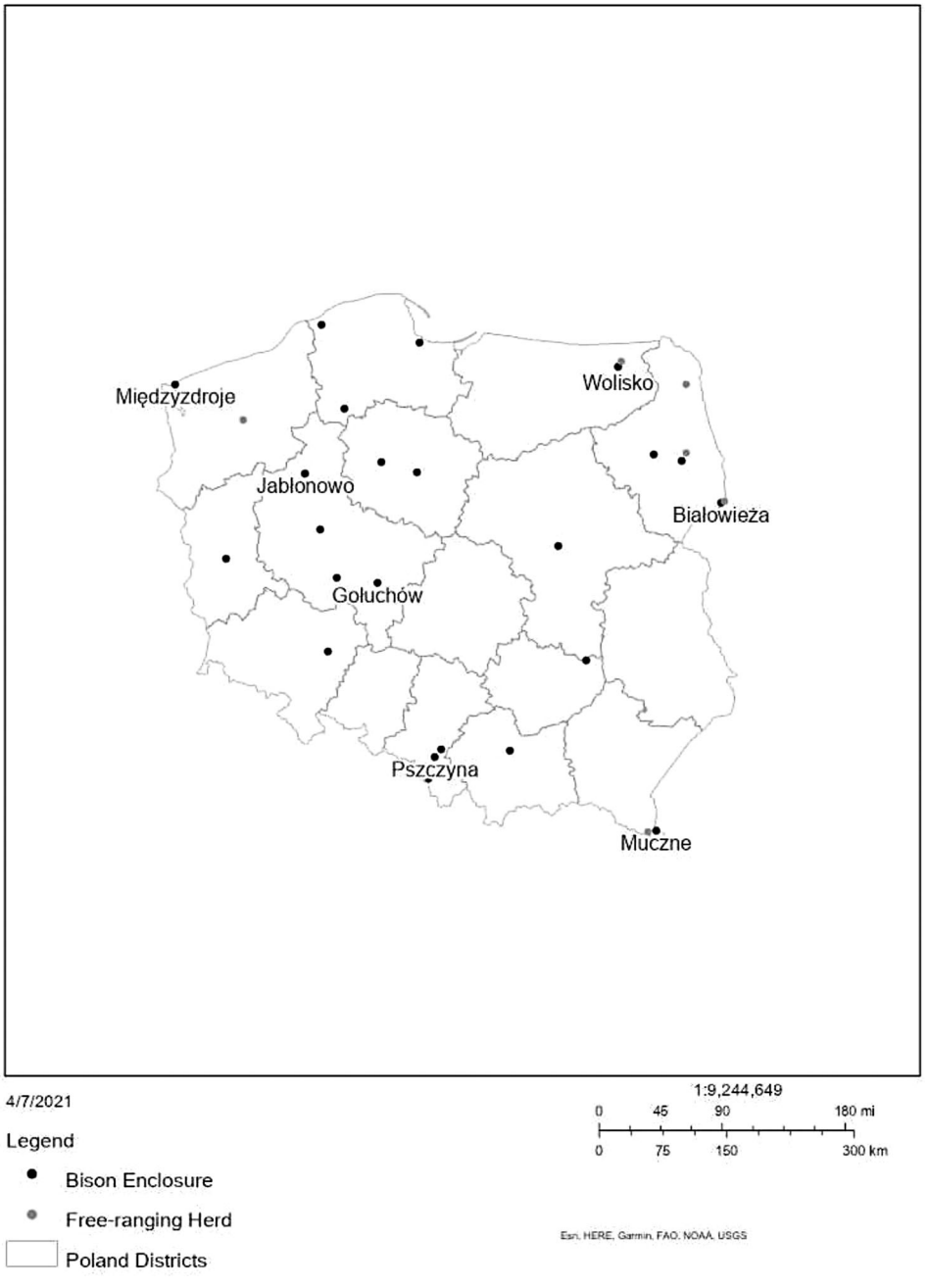


Figure A. 2.#Bison Enclosure Map.

supported by the data, there are multiple recipes to achieve the same high/low score of support for protection of bisons. On the other hand, the innate causality of the asymmetrical model craves that the rejected outcome (∼outcome) us unique and is not the mirror opposite of the outcome (Tenet 4: the causal asymmetry principle). As presented in the table 6 the negation of outcome (∼C) comprised of unique recipes that are different in nature than the recipes for the outcome (C).

Another assumption (Tenet 5) points to the fact that a single antecedent (e.g. knowledge) can contribute to the prediction of the outcome both positively and negatively. In this study, the presence and absence of knowledge (kno and ∼kno) have contributed to both low and high score of the outcome.

All in all, MTE and SUP are complex and is well-predicted by key tenets of complexity theory, therefore, over simplification of modelling SUP using linear models should not be avoided in further decision-making process (Armstrong, 2011). SUP as a human behavioural outcome is a complex phenomenon that has to be predicted using asymmetrical approaches (Olya & Akhshik, 2019; Olya & Han, 2020).