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RESEARCH ARTICLE OPEN ACCESS

Memorable Whale Watching Tourism Experiences: Insights From the Azores

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ABSTRACT

This study examines the roles of learning, experience co-creation, and experiential satisfaction as antecedents of a memorable whale-watching tourism experience, as well as the relationships between experiential satisfaction, memorable whale-watching tourism experience, hedonic well-being, place attachment, and pro-environmental behavior. Using data collected from 247 tourists who had taken a whale-watching trip in the Azores, partial least squares structural equation modeling was then applied to the dataset. The results indicate that the higher the levels of learning, experience co-creation, and experiential satisfaction, the more memorable is the whale-watching tourism experience. Experiential satisfaction and memorable whale-watching tourism experience are, in turn, significant determinants of hedonic well-being, place attachment, and pro-environmental behavior. The paper therefore calls for greater efforts by whale-watching trip providers to enhance their learning and interpretation programs and to ensure that the overall trip experience is as interactive as possible.

1 | Introduction

Whale-watching tourism (WWT) has grown rapidly from a niche tourism activity in California in the 1950s (Garrod and Wilson 2004) to what is today a mass global tourism phenomenon (León et al. 2025). As a non-consumptive form of nature-based tourism (NBT), WWT encompasses allowing visitors to encounter whales in their natural habitats. WWT is widely considered a candidate form of sustainable tourism insofar as it provides an economically feasible substitute to commercial whaling (Richards et al. 2021). WWT can, indeed, bring a range of benefits to destinations where it takes place (Garrod and Wilson 2004), including employment and incomes for the local economy (Win et al. 2023). It may also help to reduce any economic dependency on traditional sectors such as fishing and

agriculture (Richards et al. 2021). WWT also serves as a platform to provide environmental education and interpretation to tourists, not only about the conservation of marine mammals and their habitats but also more generally (Clark et al. 2019).

Simultaneously, tourism providers have been attempting to make their offers more memorable (Hosany et al. 2022; Sthapit et al. 2025). Doing so can bring many benefits. Tourists who have MTEs are not only more likely to undertake the activity again but also to recommend it to others (Chen et al. 2023). There remains, however, little consensus about how MTEs are formed (Hosany et al. 2022; Sthapit et al. 2024b, 2025). Previous studies have often adopted Kim et al.'s (2012) MTE model (where the antecedents of MTEs are refreshment, involvement, meaningfulness, hedonism, local culture, novelty, and knowledge) and to

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apply it without adaptation to new settings. These have been as diverse as Taiwanese heritage sites (Lee 2015) and coffee plantations (Wang et al. 2019), local cuisine in Ghana Adongo et al. (2015), and a museum and a zoo in Finland (Coudounaris and Sthapit 2017).

Ye et al. (2021) suggest, however, that the determinants of MTEs tend to be highly contextual. This may be especially the case with respect to NBT (Sthapit et al. 2024a). These include the often deeply emotional dimension of encounters with wildlife in natural settings (Lopez and Pearson 2017), and the enhanced need for sustainable management practices due to the potential impacts of NBT on the natural environment (Amerson and Parsons 2018). As such studies applying Kim et al.'s (2012) model may be overlooking possible alternative constructs that could better explain MTEs in the NBT context (Hosany et al. 2022). Using WWT as an exemplary instance of NBT, this study therefore sets out to develop and test a new model of memorable whale-watching tourism (MWWT).

The antecedent (stimulus) variables used in this study have been chosen to reflect not only the experiential and co-creative aspects of WWT but also its special emphasis on learning. The outcome (response) variables, meanwhile, have also been selected to reflect the nature-based context of WWT. These comprise hedonic well-being (HWB), place attachment (PA) and pro-environmental behavior (PEB). Regarding well-being, it is noted that tourists engage in activities or visit destinations when they feel that doing so will add to their well-being (Alegre and Cladera 2006). It is also notable that there is a growing global market for holidays focusing on well-being (Vada et al. 2019) and that natural areas are popular venues for such activities. Indeed, the well-being benefits of spending time in nature are widely acknowledged (Vada et al. 2019). The often deeply emotional interactions with whales that are part of WWT may, in turn, encourage tourists to develop PA to a destination (Eisenhauer et al. 2000). Moreover, growing attention is now being paid to the need to encourage PEB on the part of tourists to address the mounting conservation concerns regarding whales and marine habitats (Gao et al. 2023). As such, the model postulates that memorable whale-watching tourism experience (MWWTE) may deliver benefits for each of the three pillars of sustainable development—people (HWB), place (PA) and planet (PEB) – otherwise known as the ‘3Ps’ of sustainability (Hansmann et al. 2012).

2 | Literature Review

2.1 | Stimulus–Organism–Response (S-O-R) Theory

This study uses S-O-R theory as the theoretical foundation to link the antecedents and outcomes of MWWT. S-O-R theory proposes that the decision-making environment contains stimuli (S) that can influence an individual's internal (or ‘organismic’) state (O). This, in turn, can prompt certain behavioral responses (R) from the individual (Mehrabian and Russell 1974). In this study, learning and experience co-creation represent the stimuli encountered during WWT. The ‘organism’ in S-O-R theory can be defined as the sum the

“internal processes and structures intervening between stimuli external to the person and the final actions, reactions, or responses emitted” (Pandita et al. 2021, p. 3). Some studies that have used S-O-R theory in the tourism setting indicate that satisfaction (Hsu et al. 2021) and MTEs are best included as internal states of the organism component (Chen et al. 2022). The organism component is thus represented by experiential satisfaction and MWWTE. Concerning response variables, intention to revisit (Rodrigues et al. 2023) and intention to give positive word-of-mouth (Chen et al. 2022) have been employed as outcome variables. Such variables are only indirect means, however, of the well-being ultimately derived from the experience. This study will therefore use three response constructs that directly relate to well-being, those being HWB, PA, and PEB (Figure 1).

2.2 | Learning

Learning is widely used as a variable of interest in tourism studies, and more meaningful learning tends to occur when the consumption process is more enjoyable and pleasant, suggesting that tourism can be an effective medium for learning (Huang et al. 2022; Chen 2025). As Pearce and Lee (2005) note, learning can be a significant motivation for tourism. Learning can be regarded as a cognitive, emotional, and behavioral process (Falk et al. 2012) that involves tourists acquiring information, embedding it as knowledge, and developing skills and abilities based on that knowledge (Huang and Lin 2023). WWT offers tourists the opportunity to learn about whales, marine environments, and conservation (Ziegler et al. 2021).

Learning is a vital element of many WWT experiences, with trip operators typically having on-board staff tasked with educating tourists, the aim being to explain why better protection and conservation of whales and their habitats is required (Tkaczynski et al. 2023). Indeed, WWT is often part-funded by research that uses the vessel as a research platform, with the on-board staff serving in a dual role as field scientist and educator/interpreter. The educational efforts and interpretation provided in this way are widely believed to be an important driver of PEB (García-Cegarra and Pacheco 2017). Because they are large, charismatic mammals, it has been argued that whales make excellent environmental ambassadors (Milstein 2008). On-board staff will typically spot individuals or groups of animals; identify species, ages, and sex; explain whale physiology; discuss the natural history of whales; talk about how their relationship with humans has changed; talk about cetacean conservation, and so on. There is, however, a well-established view that education alone is insufficient to sponsor real change. The use of interpretation methods, which aim to influence behavior, is thus deemed crucial (Suárez-Rojas et al. 2023). Only by changing people's ways of thinking and motives for action can WWT produce greater PEB in society at large (Finkler and Higham 2020).

Learning activities can also appreciably enhance tourists' satisfaction with the trip (Tkaczynski et al. 2023; Guerreiro et al. 2025) and the quality of the experiences they receive (Tung and Ritchie 2011). Ballantyne et al. (2011) argues that wildlife tourism can provide tourists with life-changing (or ‘peak’) experiences that result in long-lasting memories. This is because

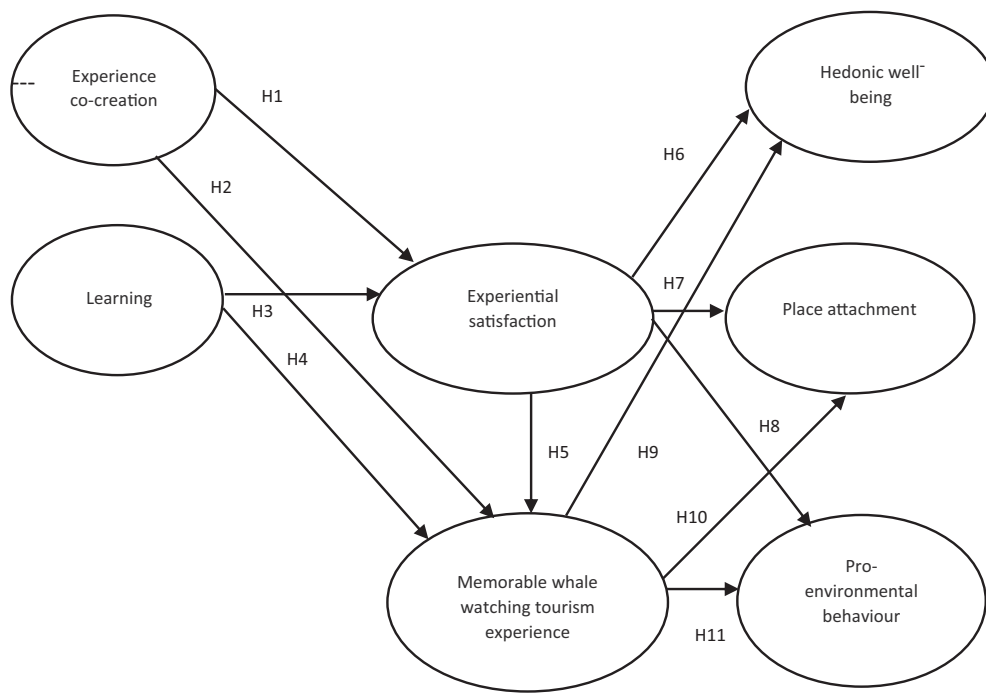


FIGURE 1 | The conceptual model.

wildlife tourists' memories of their experiences typically include elements of emotional affinity and reflective response, accompanied by strong sensory stimuli. This makes the WWT experience more personal and relevant to participants, thus enhancing its memorability. This finding is corroborated in the specific case of WWT by (Kruger et al. 2018), whose study found that both education and interpretation contributed to the memorability of the trip. Thus, we propose:

Hypothesis 1. *Learning during a whale watching trip positively influences tourists' experiential satisfaction.*

Hypothesis 2. *Learning during a whale watching trip positively influences tourists' MWWTEs.*

2.3 | Experience Co-Creation

'Experience co-creation' refers to the joint creation of value by customers and service providers (John and Supramaniam 2024; Borges-Tiago and Avelar 2025). Experience co-creation requires the resources provided by each party to be integrated. The service provider and customer work together in a co-creative process which, if successful, allows the former to supply a customized experience that meets the specific requirements of the latter (Zatori et al. 2018). Interpersonal interactions are thus fundamental conditions of experience co-creation (Prahalad and Ramaswamy 2004; Chathoth et al. 2016).

Tourists usually have significant freedom to decide where to go and what activities to undertake when they are there (Mathis et al. 2016). Tourism is thus generally considered to be a co-created experience, while the value generated by tourism is widely understood to be a co-creative value. As with all

tourism experiences, WWT involves the co-creation of experiences that are intangible, heterogeneous, and people-based (Xie et al. 2020). Interaction is crucial in WWT, insofar as the experience involves tourists interacting with wildlife (e.g., observing, photographing, and/or learning about them), service staff, other tourists, and sometimes also residents (Malone et al. 2017). The setting for this interaction will, in many cases, be the education and interpretation provided by the on-board staff. Typically, the learning process is a highly interactive one. Whale-watching tourists are often, for example, invited to assist the crew in spotting whales and in species identification, with identification guides provided to assist in the latter. Indeed, education and interpretation programs tend to work best if they are delivered in an interactive manner that encourages reflective engagement (Lee et al. 2023). Such activities also tend to involve informal interaction with other tourists, turning the experience into a social one in which camaraderie is quickly formed.

It can be argued, however, that while interaction between humans is important, the more important co-creative behavior is the human-nature interaction, particularly between tourists and the whales that have come to see (Valentine et al. 2004). As wild creatures with free agency, whales are clearly an important part of any WWT trip, although not always the most important (Orams 2000). Sometimes the whales may choose not to appear at all, preferring to avoid the whale-watching tourists' attention; at other times they may approach the vessel and interact directly with the people on board, displaying spectacular behaviors such as breaching (Whitehead 1985).

It is broadly agreed that the quality of such co-creative interactions can notably impact the tourist experience (McCartney and Chen 2020). As such, the satisfaction derived from WWT can be measured in the way it is with other tourism experiences (Bentz et al. 2016). The value-in-use generated by WWT experience

co-creation can thus be viewed as a source of customer satisfaction (Prebensen and Xie 2017) and a main driver of experience memorability (Campos et al. 2017). Thus, we propose:

Hypothesis 3. *Experience co-creation positively influences tourists' experiential satisfaction.*

Hypothesis 4. *Experience co-creation positively influences tourists' MWWTEs.*

2.4 | Experiential Satisfaction

According to Tran et al. (2021), experiential satisfaction relates to a consumer's general evaluation of tourist experience and widely considered a core component of any tourism experience. The level of satisfaction a consumer achieves is determined by their subjective evaluation of how far the consumption experience meets their expectations (Yen and Yu 2022). Expectations are related to the consumer's anticipation of the various benefits that flow from consuming a product or service (Amin et al. 2021). Expectation disconfirmation theory suggests that satisfaction results from the positive disconfirmation of a consumer's expectations. This occurs when the consumption experience exceeds expectations (Yang et al. 2024).

How much satisfaction a tourist receives can then affect other elements of the experience: in this context, MWWTEs, HWB, PA, and PEB. Indeed, Sthapit et al. (2023) found that experiential satisfaction was significantly and positively related to MTEs in the context of NTB, suggesting that tourists who believe the experience has met or even exceeded their expectations will have stronger and longer-lasting memories of it. George and George (2004), meanwhile, found that when novelty-seeking tourists were more satisfied with a destination, they tended to develop PA and, crucially, to declare themselves to be more likely to visit it in the future.

With regard to how experiential satisfaction and HWB are related, Ahn et al. (2019) found that the satisfaction of integrated-resort tourists' autonomy and relatedness needs (although not their competence needs) contributed positively to their perception of HWB. This finding is corroborated in a study by Armbricht and Andersson (2020), whose study of sport event participants found that experiential satisfaction was positively related to PA.

Several other studies locate satisfaction as an antecedent of PA. A study of international tourists in Thailand by Hosany et al. (2017), for example, found that while both emotions and satisfaction contributed positively and significantly to PA, satisfaction was a significant mediator of the relationship between emotions and intention to recommend. Ramkissoon and Mavondo (2015), meanwhile, conducted a study of repeat visitors to a national park in Australia, concluding that satisfaction had a significant positive effect on antecedents of PA. They also found that PEB significantly mediated this relationship.

Other studies have identified this link between experiential satisfaction and PEB. For example, in a study of a 'last-chance tourism' destination (a glacial landscape in France), Salim

et al. (2023) found that experiential satisfaction significantly increased tourists' PEB intentions. Thus, we propose:

Hypothesis 5. *Experiential satisfaction positively influences tourists' MWWTEs.*

Hypothesis 6. *Experiential satisfaction positively influences tourists' HWB.*

Hypothesis 7. *Experiential satisfaction positively influences tourists' PA.*

Hypothesis 8. *Experiential satisfaction positively influences tourists' PEB.*

2.5 | Memorable Whale Watching Tourism, Hedonic Wellbeing, Place Attachment and Pro-Environmental Behavior

According to Kim et al. (2012), MTE is an attitudinal construct describing the positive memories of someone who has had a tourism experience. MTE is based, thus, upon the tourist forming personal memories of the experience (Hosany et al. 2022). In this study, MWWTE is defined as an experience that generates pleasant memories that can be recalled afterwards in detail.

As an activity, tourism is intended to increase the participants' happiness (Vada et al. 2019). This is represented in this study by HWB, which can be defined as the elevation of an individual's mood by means of them attaining "pleasure, enjoyment, and absence of discomfort" (Huta and Waterman 2014, p. 1427). HWB tends to be assumed to be a transient state (Smith and Diekmann 2017). It can be argued, however, that HWB can persist after the experience has been completed, in that recalling an MTE can enhance a tourist's subjective well-being perhaps long after they have completed their trip (Jepson et al. 2019). Some studies have found MTEs and HWB to be positively related. Trinanda et al.'s (2022) study of tourists visiting various tourism destinations in West Sumatera, for example, found that MTEs and HWB were significantly related in a positive way. Vada et al.'s (2019) study of general travelers, meanwhile, also found that MTE significantly affects HWB.

PA denotes the emotional bond between people and place. Tourism studies have generally measured PA through the notions of place identity and place dependency. The former refers to the extent to which a place may be considered distinctive, which tends to emerge as an individual accumulates experience of it (Ramkissoon and Mavondo 2015). The latter denotes functional attachment, meaning the extent to which a tourists' needs are met through interaction with a destination's resources (Loureiro 2014). Empirical evidence suggests that MTEs are influential in the development of PA (Sthapit et al. 2023; Vada et al. 2019). For example, in the context of NBT, Sthapit et al. (2023) identified a significant positive relationship between MTEs and PA. Destination-level PA has also been found to depend partially on MTE (Sthapit et al. 2017; Fahlevi 2025).

PEB denotes actions undertaken by individuals or groups intended to result in a reduction of the negative effects their

everyday actions have on the natural environment (Kollmuss and Agyeman 2002). NBT experiences can lead to improved connections between humans and nature, thus promoting PEB (Clark et al. 2019). Studies have also demonstrated that NBT experiences that encouraged tourists to reflect on their relationship with the natural environment can promote PEB (Obradović et al. 2022; Salim et al. 2023). It has also been found that tourists who actively co-create memorable experiences that increase their connectedness to the natural environment tend to engage in more PEB (Zhang et al. 2023). In the context of NBT, Obradović et al. (2022) have found that MTE and PEB were positively related. Thus, we propose:

Hypothesis 9. *Memorable whale tourism experience positively influences tourists' HWB.*

Hypothesis 10. *Memorable whale tourism experience positively influences tourists' PA.*

Hypothesis 11. *Memorable whale tourism experience positively influences tourists' PEB.*

3 | Methods

3.1 | Data Collection Methods and Instruments

The data for this study were collected using a self-administered, online questionnaire from tourists aged 18 years and over, that were registered in the client's database of the Azorean whale-watching firm, Futurismo. Tourists who had experienced a whale-watching trip in the Azores were invited to participate in the research. To provide greater consistency to the sample, respondents were required to have engaged in a whale-watching trip in the Azores between August 2021 and July 2023. Two filter questions were used: "Are you 18-year-old or over?" and "Have you engaged in a whale-watching trip in the Azores between August 2021 and July 2023?" To encourage high-quality responses, potential respondents were told that the researchers would be checking their responses for any indication of random or indiscriminate responses. Such data were deleted from the data set. Respondents were recruited using convenience sampling because a suitable sampling frame was not available.

Several strategies were employed to boost the reliability and representativeness of the data in the design and administration of the questionnaire. Before distribution, five tourism researchers pre-tested it to help minimize potential errors, improve clarity, and ensure the questions are relevant and flow logically. Participants were then recruited from the client database of a WWT company, targeting only tourists who had participated in the experience between August 2021 and July 2023. This approach not only selected a more interested participant base but also reduced potential recall bias by focusing on individuals with recent experiences. The survey was administered online, making the most of the ability of digital platforms to reach a geographically diverse audience while enhancing ease of participation.

All items in the questionnaire were scored on a five-point Likert scale ranging from 1 (strongly disagree or does not describe my

opinions) to 5 (strongly agree or clearly describes my opinions). 'Learning' comprised six items adapted from Asan et al. (2023) and Bentz et al. (2016). 'Experience co-creation' was measured using five items adapted from Mathis et al. (2016), 'Experiential satisfaction' using three items borrowed from Oh et al. (2007), and MWWTE using three items adapted from Oh et al. (2007). The five items used to measure HWB were adapted from Kesgin et al. (2022). Eight items adapted from Gross and Brown (2008) and Yuksel et al. (2010) were used to measure PA. The five items used to measure PEB were adapted from a study by Li et al. (2023). In total, therefore, 33 items were used in this study (see Appendix A). By incorporating widely recognized scales for constructs such as experiential satisfaction and learning, the survey was equipped to gather robust and meaningful data aligned with the study's objectives. The survey was distributed in August 2023 by a WWT provider based in the Azores.

4 | Data Analysis and Results

4.1 | Profile of the Respondents

A total of 248 responses were received, but one of these was invalid due to the respondent's visit not being between August 2021 and July 2023. The final sample comprised 247 respondents, 60.3% of whom were women, 61.5% were under 50 years of age, 52.6% were married, 30.8% were traveling with family, and 29.5% were traveling with their spouse/partner (29.5%). In terms of country of origin, 17% were from the USA, 12.1% from Portugal, and 10.9% from the UK. Most respondents were experiencing WWT in the Azores for the first time (80.2%) and most were accompanied on the experience by someone they knew (85%).

4.2 | Common Method Bias

Studies indicate that common method bias (CMB) can be problematic where data have been collected using a self-administered questionnaire (Conway and Lance 2010). Studies in which participants respond to items in a single survey at a given point in time are considered especially prone to CMB (Bodner 2006). Furthermore, when both the dependent and independent variables take the same response format, the presence of CMB may seriously impact a study's empirical results (Podsakoff et al. 2012). This study therefore used several preventive procedures to minimize CMB (Kock 2015). Attention-check controls were added to the survey to deter subjects from being careless in their responses. Different scale formats were used for the dependent and independent variables. Screening questions were used to make sure that only respondents with the required experience were selected. Clear and detailed instructions were given on how the questionnaire should be completed.

Two methods were used to search for any common method variance (CMV): consideration of the variance inflation factor (VIF) and the correlation matrix procedure. To confirm that the model and data are free of CMV, Kock (2015) recommends the value of full collinearity VIF for each construct should be lower than 3.3, while Rasoolimanesh et al. (2021) recommend the correlation between constructs should be less than

0.9. For this study, the full collinearity VIF across the constructs ranged between 1.633 and 2.835, while all correlations were less than 0.9. The data can therefore be considered free of CMV.

4.3 | Model Assessment Using PLS-SEM

This study used SmartPLS 4 software to conduct a PLS-SEM analysis of the dataset (Ringle et al. 2015). PLS-SEM was chosen because of the complexity of the conceptual framework and the prediction-oriented basis for the study (Hair et al. 2019). G*Power was used to calculate the minimum sample size required (Faul et al. 2009). The results suggested that a minimum sample of 74 was needed to obtain a power of 0.95.

4.4 | Assessment of the Measurement Model

PLS-SEM analysis requires careful data treatment if the resulting model is to be robust and valid. This can then provide a robust foundation for the subsequent path modeling and hypothesis testing (Hair et al. 2019). In evaluating the fit of the saturated statistical model to the observed data, two key indicators require close attention: the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The SRMR, which quantifies the standardized difference between the observed and predicted correlations across all data points, yielded a value of 0.064. This figure falls well within the threshold commonly accepted for indicating good model fit, typically cited as less than 0.08, suggesting that the model's predicted correlations align closely with the observed correlations (Hair et al. 2019). Additionally, the NFI, a comparative fit index used to assess the model relative to a baseline model of no fit, provided a value of 0.808, which is considered indicative of an acceptable model fit (Hair et al. 2019). Therefore, the SRMR and NFI values collectively support the conclusion that the model demonstrates a satisfactory fit to the data, highlighting its utility in capturing the underlying patterns and structures within the observed variables. The Cronbach's Alpha values for all but one of the constructs in the model surpassed the commonly applied threshold of 0.7, indicating a strong level of internal consistency (Ringle et al. 2015). Only the PEB construct presented a slightly lower value (0.685). The composite reliability measures, indicated by rho_a and rho_c, exceeded the 0.7 benchmark for all constructs except PEB, which presented a rho_a value of 0.696. This indicates that the constructs within the model were generally measured reliably. The Heterotrait-Monotrait (HTMT) ratio was used for assessing discriminant validity. A value of 0.887 was recorded between MWWTE and experiential satisfaction, indicating a high similarity between these constructs. This could challenge their distinctiveness if not well supported by previous evidence. PEB had lower HTMT values in relation to other constructs (ranging from 0.238 to 0.393), suggesting it is quite distinct from constructs such as experience co-creation and HWB (Table 1).

The model was also assessed in terms of the indicator loadings, the AVE, the composite reliability (CR), consistent reliability (Rho_A), and the Cronbach's alpha of each latent variable. It was necessary to drop one of the items from the

TABLE 1 | Heterotrait-monotrait ratio (HTMT).

	HTMT
Experiential satisfaction < - > Experience co-creation	0.7143
Hedonic well-being < - > Experience co-creation	0.7077
Hedonic well-being < - > Experiential satisfaction	0.7213
Learning < - > Experience co-creation	0.7232
Learning < - > Experiential satisfaction	0.6892
Learning < - > Hedonic well-being	0.5990
Memorable experiences < - > Experience co-creation	0.7010
Memorable experiences < - > Experiential satisfaction	0.8874
Memorable experiences < - > Hedonic well-being	0.7398
Memorable experiences < - > Learning	0.6662
Place attachment < - > Experience co-creation	0.6560
Place attachment < - > Experiential satisfaction	0.7196
Place attachment < - > Hedonic well-being	0.7787
Place attachment < - > Learning	0.5638
Place attachment < - > Memorable experiences	0.7108
Pro-environmental behavior < - > Experience co-creation	0.2966
Pro-environmental behavior < - > Experiential satisfaction	0.2805
Pro-environmental behavior < - > Hedonic well-being	0.3849
Pro-environmental behavior < - > Learning	0.2376
Pro-environmental behavior < - > Memorable experiences	0.2465
Pro-environmental behavior < - > Place attachment	0.3933

initial scale because of values below 0.5, namely X6 ("My recent whale watching tourism experience revealed that locals know a lot about whales"), which had a value of 0.404. This was also done with two items from the scales used to measure PA: X25 ("My recent whale-watching tourism experience made me feel that holidaying in Azores means a lot to me"), which had a value of 0.428, and X30 ("I get more satisfaction out of holidaying in this whale watching tourism destination than from visiting similar destination"), which had a value of 0.331.

Regarding convergent validity, the AVE shows how much variance in the indicators is captured by the latent construct. The AVEs of all the constructs were greater than the recommended threshold of 0.5, demonstrating satisfactory convergent validity and that each indicator effectively represented its respective construct (Table 2).

TABLE 2 | List of constructs and measurements used.

Constructs and measurement	Mean and SD	Loadings	R-square	Cronbach's Alpha	Rho_A	CR	AVE
Learning			—	0.875	0.881	0.909	0.668
L1 (X1)	4.26/0.84	0.809					
L2 (X2)	4.11/0.90	0.850					
L3 (X3)	4.04/0.92	0.870					
L4 (X4)	4.54/0.71	0.825					
L5 (X6)	4.23/0.92	0.726					
Experience cocreation			—	0.904	0.906	0.929	0.724
EXCC1 (X7)	4.13/0.94	0.853					
EXCC2 (X8)	3.66/1.04	0.813					
EXCC3 (X9)	3.60/1.04	0.879					
EXCC4 (X10)	3.64/1.01	0.823					
EXCC5 (X11)	3.69/1.08	0.883					
Experiential satisfaction			0.450	0.852	0.853	0.911	0.773
EXS1 (X12)	3.95/1.07	0.823					
EXS2 (X13)	4.41/0.81	0.927					
EXS3 (X14)	4.34/0.89	0.886					
Memorable experiences			0.689	0.962	0.962	0.975	0.930
MEX1 (X15)	4.46/0.89	0.943					
MEX2 (X16)	4.49/0.83	0.977					
MEX3 (X17)	4.50/0.79	0.972					
Hedonic well-being			0.521	0.939	0.949	0.954	0.806
HWB1 (X18)	3.64/1.12	0.920					
HWB2 (X19)	3.83/1.08	0.929					
HWB3 (X20)	3.74/1.13	0.914					
HWB4 (X21)	3.41/1.12	0.913					
HWB5 (X22)	3.40/1.09	0.806					
Place attachment			0.485	0.909	0.926	0.930	0.691
PLA1 (X23)	4.14/0.99	0.874					
PLA2 (X24)	3.53/1.17	0.881					
PLA3 (X26)	4.03/0.98	0.881					
PLA4 (X27)	3.55/1.14	0.892					
PLA5 (X28)	2.98/1.12	0.714					
PLA6 (X29)	3.11/1.05	0.725					
Pro-environmental behavior			0.049	0.685	0.696	0.807	0.511
PEB1 (X31)	4.69/0.63	0.745					
PEB2 (X32)	4.36/0.91	0.657					
PEB3 (X33)	4.82/0.49	0.754					

(Continues)

TABLE 2 | (Continued)

Constructs and measurement	Mean and SD	Loadings	R-square	Cronbach's Alpha	Rho_A	CR	AVE
PEB4 (X34)	4.20/0.91	0.700					
PEB5 (X35)	4.55/0.72	0.745					

Figure 2 and Table 3 show that learning had a significant positive impact on experiential satisfaction, supporting H1 ($\beta_1 = 0.283$, $p = 0.000$), and a stronger effect on MWWTE, supporting H2 ($\beta_2 = 0.436$, $p = 0.000$). The analysis also revealed that learning positively and significantly impacted experiential satisfaction and MWWTE, thus supporting H3 and H4 ($\beta_3 = 0.096$, $\beta_4 = 0.166$), although the magnitude of influence is somewhat lower. The direct effect of experiential satisfaction on MWWTE was positive and stronger, supporting H5 ($\beta_5 = 0.653$). The coefficient paths indicated that experiential satisfaction positively impacted tourists' HWB ($\beta_6 = 0.234$), PA ($\beta_7 = 0.280$) and PEB ($\beta_8 = 0.122$). MWWTE positively affected tourists' HWB ($\beta_9 = 0.520$) and had a smaller effect on PA ($\beta_{10} = 0.091$), supporting H9 and H10. An even smaller impact was observed with respect to the impact of MWWTE on PEB ($\beta_{11} = 0.049$).

The analysis employed bootstrapping with 5000 iterations to compute t-values, which were used to evaluate the direct effects proposed in the study's hypotheses. Table 3 presents a summary of the hypothesis tests, including means, standard deviations, t-statistics, and p-values obtained from the bootstrapping process at a 95% confidence level. Based on the path coefficients, t-values, and p-values provided, the acceptance of nine out of the eleven hypotheses can be confirmed.

5 | Discussion

The results of this study offer several important new insights into WWT. First, the study found that learning during a WWT experience could positively affect both experiential satisfaction and MWWTE. This supports H1 and H2 and corresponds to previous studies suggesting that learning is a pivotal component of the WWT experience (Finkler and Higham 2020; Suárez-Rojas et al. 2023), which can enhance trip satisfaction (Tkaczynski et al. 2023) and play a significant role in the co-creation of MWWTEs (Tung and Ritchie 2011). Greater levels of learning lead to greater experiential satisfaction and a WWT experience that is more memorable. Importantly, the amount of learning had a greater predictive power with respect to MWWTE than experiential satisfaction.

Second, experience co-creation was found to be a statistically significant antecedent of experiential satisfaction and MWWTE, as proposed in H3 and H4 respectively. This supports previous studies indicating that experience co-creation drives experiential satisfaction and memorability (Campos et al. 2017; Prebensen and Xie 2017).

Third, it was found that experiential satisfaction had a significant positive role in determining MWWTE, suggesting that experiential satisfaction has a direct and positive impact on the

tourists' MWWTEs. This supports H5 and tends to corroborate previous studies indicating satisfaction and MWWTEs are positively related (Sthapit et al. 2018, 2019).

Fourth, it was found that experiential satisfaction exerted a positive influence on tourists' HWB and PA directly. These findings support H6 and H7 respectively and corroborate existing studies which indicate that experiential satisfaction derived from positive experiences that tourists can recall vividly upon returning home can contribute significantly to their HWB (Ahn et al. 2019) and PA (Ramkissoon and Mavondo 2015). However, it was not possible to establish the positive impact of experiential satisfaction on PEB (H8) as per the work of Salim et al. (2023).

Fifth, the study confirms the hypothesized relationship between MWWTE, HWB, and PA. An increase in MWWTE positively influences HWB and PA, thus supporting H9 and H10, respectively. It was not possible to validate H11. These results further underscore the findings of previous studies that MTEs contribute positively to HWB (Bigné et al. 2020; Trinanda et al. 2022) and PA (Sthapit et al. 2023; Vada et al. 2019), although they are not aligned with the outcome of Zhang et al. (2023).

5.1 | Theoretical Implications

First, it responds to calls made in previous studies for research into other potential antecedents of MTEs. Focusing on the specific context of WWT, this study identified and tested two such variables: learning and experience co-creation. The findings suggest that both serve as significant antecedents of both experiential satisfaction and MWWTE. Given the paucity of studies of WWT experiences and the disagreement about which specific factors characterize a MWWTE, the findings of this study also enhance current understanding of the phenomenon.

Second, the findings of this study contribute to knowledge about the outcomes of WWT experiences, providing a robust foundation upon which to build future research. The findings indicate that WWT goes further than delivering mere experiential satisfaction to co-creating highly memorable experiences. This study further identifies MWWTEs as enablers of HWB, PA, and PEB, which can be taken to represent the three pillars (3Ps) of sustainable development: people, place, and planet. This advances current understanding of the importance of making WWT experience more memorable in the ways identified in this paper. It can be argued that these findings extend to NBT experiences more generally.

Third, S-O-R theory was employed, thus demonstrating the determinants and outcomes of MWWTEs from a new theoretical perspective. The results confirm the theoretical basis of

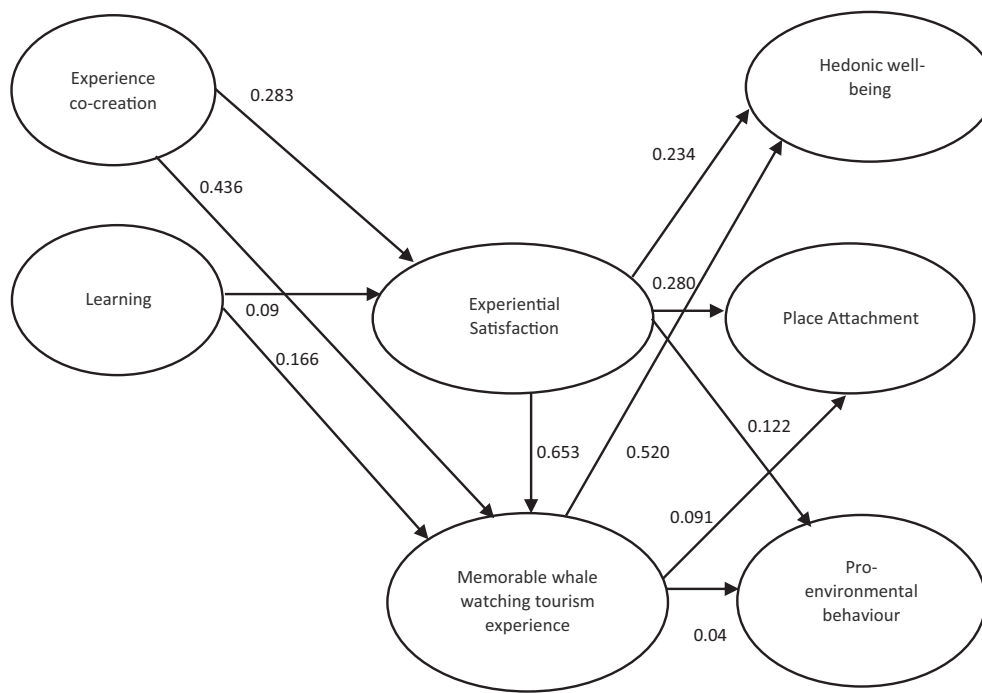


FIGURE 2 | Model estimation.

S-O-R theory, demonstrating that environmental stimuli—in this context, the learning component of WWT and experience co-creation—positively affect an individual's cognitive and affective state (experiential satisfaction and MWWTE), which, in turn, generates response behaviors (HWB, PA, and PEB).

5.2 | Managerial Implications

Two important lessons for managers of WWT experiences flow from this study. First, learning is an important input to the process. This can be enhanced by actively helping tourists to learn about the natural history, protection, and conservation of whales and their habitats. Enhancing the educational elements of WWT experiences can not only increase the experiential value of WWT for participants but also contribute to making such experiences more sustainable. WWT trip providers should therefore identify ways to maximize learning opportunities for tourists. This could include, for example, the use of guided active learning, whereby visitors can learn about the traditions and cultures of the destination community and the important relationships that exist between humans, animal species, and the marine environment. WWT tour guides should be encouraged to share their knowledge of whales and their passion for marine life and natural history more generally. Doing so is likely to encourage tourists to behave in ways that support the sustainability of whales over the course of the rest of their trip and in the future, once they have returned home. It has often been found that learning activities are most effective when they are combined with entertainment or having fun. One way of achieving this might be to gamify the learning experience.

Second, if the benefits of WWT for sustainability are to be fully realized, it is vital that tourists are not viewed as merely

passive agents in the WWT experience. Rather, they should be seen specifically as active co-creators. WWT trip providers should therefore be trained to interact actively with customers by sharing information about the natural history of whales, thereby helping them to interpret the behaviors they observe. The emphasis should be on working with tourists to co-create their experiences. Indeed, tour guides are usually on the front line and present when visitors are experiencing WWT. Frequent interactions will help maintain tourists' interest, thereby enabling them to make maximum use of their time to co-create their experience within the span of time that is available to them. Tourists should be the focus of attention for service providers during the WWT experience, while interactions should be used to help them acquire memorable experiences. WWT trip providers should also focus continuously on improving the outcomes of the experiences they offer. These outcomes should contribute positively to the interests of people (HWB), place (PA) and planet (PEB), that is, to each of the '3Ps' of sustainable development. This suggests that making WWT more memorable can potentially also make it more sustainable.

5.3 | Limitations and Recommendations for Future Research

The inclusion of only three antecedents of MWWTE is limited. Future research must expand this scope to provide a more comprehensive understanding. The pre-testing of the questionnaire was limited to just five tourism researchers. Future studies should conduct pre-tests with a representative sample from the target population to capture its diversity. The reliance on convenience sampling undermines the reliability of the results. Future research must use more rigorous sampling methods to enhance the validity of their results.

TABLE 3 | Summary of hypothesis testing.

Hypothesis	Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	p	Decision
H1	Experience co-creation—> Experiential satisfaction	0.283	0.284	0.053	5.316	0.000	Supported
H2	Experience co-creation—> Memorable experiences	0.436	0.435	0.058	7.512	0.000	Supported
H3	Learning—> Experiential satisfaction	0.096	0.097	0.045	2.117	0.034	Supported
H4	Learning—> Memorable whale watching tourism experiences	0.166	0.166	0.059	2.792	0.005	Supported
H5	Experiential satisfaction—> Memorable whale watching tourism experiences	0.653	0.651	0.058	11.282	0.000	Supported
H6	Experiential satisfaction—> Hedonic well-being	0.234	0.237	0.081	2.881	0.004	Supported
H7	Experiential satisfaction—> Place attachment	0.280	0.283	0.084	3.347	0.001	Supported
H8	Experiential satisfaction—> Pro-environmental behavior	0.150	0.157	0.108	1.392	0.164	Not Supported
H9	Memorable whale watching tourism experiences—> Hedonic well-being	0.520	0.517	0.075	6.939	0.000	Supported
H10	Memorable whale watching tourism experiences—> Place attachment	0.451	0.447	0.082	5.498	0.000	Supported
H11	Memorable whale watching tourism experiences—> Pro-environmental behavior	0.049	0.095	0.116	0.712	0.476	Not Supported

Decision-makers should exercise caution when interpreting findings derived from convenience sampling. By focusing solely on tourists who have engaged in wildlife-watching tours, the current findings lack generalisability to other forms of NBT. Future studies need to broaden their scope to increase applicability across different tourism contexts. The use of self-reported surveys is a limitation. Future research should employ qualitative methods, for example, in-depth interviews to obtain deeper insights. Such approaches would provide wildlife-watching trip providers with valuable information to enhance the memorability of tourists' experiences. Finally, the data collection method depended on participants' ability to

recall their wildlife-watching experiences from August 2021 to July 2023. To mitigate potential recall bias, future studies should conduct data collection closer to the time of the trip.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Appendix A

Operationalization of the constructs used in this study **.

Learning (Asan et al. 2023; Bentz et al. 2016).

L1 During the recent whale watching tourism experience, I expanded my understanding of whales.

L2 During the recent whale watching tourism experience, I gained information and knowledge about whales.

L3 During the recent whale watching tourism experience, I learned many different things about whales.

L4 During my recent whale watching tourism experience I noticed that the guides had great knowledge to share.

L5 During my recent whale watching tourism experience I noticed that the guides had great experiences to share.

L6 My recent whale watching tourism experience revealed that locals know a lot about whales.

Experience co-creation (Mathis et al. 2016).

EXCC1 Working alongside a whale watching tour guide and other tourists allowed me to have a great social interaction during my recent whale watching tourism experience, which I enjoyed.

EXCC2 I felt comfortable working with a whale watching tour guide and other tourists during my recent whale watching tourism experience.

EXCC3 The setting allowed me to effectively collaborate with a whale watching tour guide and other tourists during my recent whale watching tourism experience.

EXCC4 My recent whale watching tourism experience was enhanced because of my participation in the experience.

EXCC5 I felt confident in my ability to collaborate with a whale watching tour guide and other tourists during my recent whale watching tourism experience.

Experiential satisfaction

EXS1 The recent whale watching tourism experience was beyond my expectations.

EXS2 I really liked the visit to Azores for the whale watching trip.

EXS3 It was worthwhile to visit Azores for whale watching tourism.

Memorable whale watching tourism experience (Oh et al. 2007).

MEX1 I have wonderful memories of the recent whale watching tourism experience.

MEX2 I will not forget my recent whale watching tourism experience.

MEX3 I will remember my recent whale watching tourism experience.

Hedonic well-being (Kesgin et al. 2022).

HWB1 The recent whale watching experience has enriched my quality of life.

HWB2 The recent whale watching experience has contributed to my life satisfaction in some way.

HWB3 The recent whale watching experience has become a source of pleasure in my life.

HWB4 The recent whale watching experience has enriched my various life domains.

HWB5 The recent whale watching experience has made me feel good about myself.

Place attachment (Gross and Brown 2008; Yuksel et al. 2010).**Place identity.**

PA1 My recent whale-watching tourism experience made me feel that the Azores is very special to me.

PA2 My recent whale-watching tourism experience made me feel that I identify strongly with the Azores.

PA3 My recent whale-watching tourism experience made me feel that holidaying in the Azores means a lot to me.

PA4 My recent whale-watching tourism experience made me feel that I am very attached to the Azores.

Place dependence.

PLA5 My recent whale-watching tourism experience made me feel that holidaying in the Azores for whale watching is more important to me than holidaying in other places.

PLA6 My recent whale-watching tourism experience made me feel that the Azores is the best place for what I like to do on holidays.

PLA5 I will not substitute this whale watching tourism destination with any other place for the experience I had there.

PLA7 I get more satisfaction out of holidaying in this whale watching tourism destination than from visiting similar destinations.

Pro-environmental behavior (Li et al. 2023).

PEB1 I accept the policies linked to whale conservation.

PEB2 I will report any pollution of the marine environment.

PEB3 I will not disturb marine life during my travel.

PEB4 If there are whale conservation activities, I am willing to attend.

X35 I will deter any behavior damaging the marine environment.