A Study on the Relationship between Environmental Cognition, Empathy with Nature and Environmental Responsibility Behavior of Coastal Tourists

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Abstract: Coastal tourism is vital for sustainable regional development, yet motivating visitors to engage in proactive environmental stewardship remains a challenge. Drawing on social-cognitive and cognition–emotion–behavior theories, this study integrates knowledge and affect by modeling how environmental knowledge and awareness jointly translate into two forms of responsible behavior—maintenance and promotion—through the mediating lens of empathy with nature. Survey data confirm that both cognitive dimensions significantly enhance nature empathy, which in turn fully mediates their positive effects on maintenance and promotion behaviors. The findings reveal a “unity-of-knowledge-and-emotion” pathway that prior fragmented studies overlooked, offering coastal managers evidence-based levers: intensify interpretive education, design empathy-evoking experiences, and invite tourists into participatory conservation activities tailored to site-specific contexts.

Keywords: Environmental responsibility behavior;Environmental cognition;Empathy with nature;Coastal tourism

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Coastal tourism attracts a large number of tourists with its beautiful marine landscapes and unique tourism experiences,becoming a hot spot for modern leisure and vacation.It not only satisfies people's needs to get close to nature but also significantly boosts the prosperity of related industries.However,coastal areas possess rich yet extremely fragile marine resources (such as beaches and coral reefs),and their ecosystems are particularly sensitive to tourism activities(especially water sports and seafood consumption),struggling to endure high-intensity development and exploitation.Once damaged by development activities or tourists' behaviors,these areas are prone to repeated damage,and their recovery process will be extremely difficult(Liu et al.,2020). The surge in the number of tourists further amplifies the destructive impact of tourism activities on the destination's ecosystems.It is widely recognized in academia that public participation is the key to environmental governance,and tourists' environmentally responsible behaviors play a core role in achieving good environmental governance through a dual mechanism of awareness-driven and action-transmitted processes(Zhang et al.,2018).The root of environmental problems lies in human behavior,and changing behavior is a necessary condition for improving environmental conditions(Pong&Tam,2023).

In the context of coastal tourism,the intimate interaction between tourists and the natural environment provides a unique research perspective.However,despite the widespread popularity of coastal tourism worldwide,research focusing on tourists' environmentally responsible behaviors in this context is relatively scarce,especially lacking in-depth empirical studies that analyze how tourists' environmental cognition and empathy with nature jointly influence their environmentally responsible behaviors.Given this,this study selects coastal tourist attractions as typical cases and constructs a conceptual model that integrates tourists' environmental cognition,empathy with nature,and environmentally responsible behaviors.This model incorporates both cognitive and emotional factors into the same analytical framework,aiming to reveal the interactive mechanism between the two in the formation of tourists' environmentally responsible behaviors.

1 Literature Review and Theoretical Basis

1.1 Coastal Tourism

Coastal tourism refers to tourism activities that primarily take coastal areas as their destinations.Scholar Hall(2001)proposed that coastal tourism encompasses all types of tourism,leisure,and recreational activities carried out in coastal regions and nearshore waters.It includes not only tourism development projects such as accommodation and catering in coastal areas,as well as infrastructure-related activities that support coastal development,like retail businesses and docks,but also specific tourism activity forms,such as recreational boating,coastal and marine ecotourism,cruise sightseeing,swimming,recreational fishing,and diving.Li Rui believes that,under a specific socio-economic environment,coastal tourism relies on the coastline and its surrounding terrestrial resources,aiming to meet people's spiritual needs,material enjoyment,and safeguard the interests of all economic entities.It involves a series of tourism activities like sea and land sightseeing and leisure vacations,as well as the various phenomena and relationships derived from them,presenting a comprehensive picture of coastal tourism(Clavé&Wilson,2017;Liu et al.,2020).

Currently,both domestic and international research on coastal tourism mainly focuses on three key areas:the development and protection of coastal tourism,coastal tourism planning and management,and the impacts of coastal tourism.The development and protection of coastal tourism resources mainly focus on how to scientifically plan and rationally utilize these valuable natural resources on the basis of maintaining the ecological environment of the coast,so as to promote the sustainable development of the tourism industry.The core issue of coastal tourism planning and management is to deeply explore the scientific theories and practical methods of coastal tourism planning,and at the same time,to propose feasible solutions to the practical problems encountered in the process of tourism management.The impact of coastal tourism mainly assesses the impact of coastal tourism on the local economy,society,culture,and environment,providing references for the formulation of relevant policies.These studies aim to explore the development patterns of coastal tourism,the challenges it faces,and the path to sustainable

development.However,research on tourists' cognition,emotions,and behaviors in coastal tourism is relatively scarce,especially targeted studies on tourists' environmentally responsible behaviors in coastal tourism.Based on this,the focus of this study is to explore the influencing mechanisms of tourists' environmentally responsible behaviors in the context of coastal tourism,and it is hoped that the research results will provide effective management insights for the sustainable development of coastal tourist attractions.

1.2 Environmental Responsibility Behavior

Environmental responsibility behavior originates from environmental psychology and refers to the proactive environmental protection activities undertaken by individuals to improve the ecological environment of a destination.It reflects a series of behaviors taken by individuals or groups to actively address environmental issues(Yang&Geng,2025).Scholars Borden and Schettino(1979)were the first to propose the concept of"environmental responsibility behavior,"which was later interpreted by other researchers according to their specific research contexts.Qiu Hongliang et al.(2018)used content analysis to dissect the concept of environmental responsibility behavior in domestic and international studies and defined it as the specific actions taken by tourists in a tourism context to mitigate the negative environmental impacts on tourist attractions or to enhance the positive environmental benefits of these areas.

Scholars both domestic and international have mainly focused on the measurement dimensions and scale development of environmental responsibility behavior,its influencing factors,and theoretical mechanisms.Some scholars have developed single-dimension scales for general research contexts.However,in addition to the single-dimension measurement method,many studies have chosen to use multi-dimension measurement methods to more comprehensively analyze environmental responsibility behavior(Cheng et al.,2022).In previous research findings,widely concerned driving factors include tourism experience,satisfaction,environmental attitudes,environmental knowledge,perceived value,place attachment,environmental emotions,and subjective norms,etc.In addition to the above factors,many situational factors may also promote or restrict the occurrence of environmental responsibility behavior.The research path of environmental responsibility behavior has shown a certain evolutionary trajectory:initially dominated by rational research,it later shifted to focus on emotional research,and now it has moved towards a stage of integration of rationality and emotion(Zhen&Tian,2017).

Moreover,the existing research contexts on tourists' environmentally responsible behaviors mainly focus on national parks,natural scenic tourist destinations,heritage tourism sites,and rural tourism areas,while theoretical examinations and case studies targeting the coastal tourism context are relatively scarce.

1.3 Environmental Cognition

Environmental cognition refers to the process by which individuals recognize,understand,identify,and judge information related to environmental issues,and its content is relatively broad(Liu&Wang,2020).Frick(2004)posited that environmental cognition encompasses individuals' awareness of environmental issues,their support for solving these issues,psychological strategies for environmental protection,and willingness to participate in environmental protection activities.Drawing on previous scholarly research,this paper posits that in the context of coastal tourism,environmental cognition refers to tourists' perceptions and evaluations of the natural environment,cultural landscapes,and social atmosphere of coastal tourism destinations.Specifically,it includes two aspects:environmental knowledge and environmental awareness.

In terms of research subjects,scholars have generally focused on the impacts of environmental cognition among residents,students,farmers,consumers,and other groups.Research exploring the impact of tourists' environmental cognition on their environmentally responsible behaviors from the perspective of tourists is relatively scarce,and even rarer are studies that divide environmental cognition into multiple dimensions and consider the direct and indirect effects of multi-dimensional environmental cognition on environmentally responsible behaviors.

1.4 Empathy with Nature

Sobel(1999),starting from the perspective of the interaction between the acting subject and the natural environment,believed that empathy with nature occurs when the subject understands the emotions brought by the natural environment and achieves emotional sharing.Yue Ting et al.(2022),based on their research on the relationship between empathy with nature and environmental protection behavior,pointed out that empathy with nature is an individual's understanding and feeling of the emotions of nature.Their research also found that individuals with high levels of empathy with nature are more likely to generate strong environmental protection motives and form good environmental awareness in daily life.This paper posits that empathy with nature refers to the emotional experience generated by people's cognition of the internal state of the natural environment in coastal tourist attractions,and these emotional experiences include both positive and negative aspects.

Although the importance of empathy with nature in tourism research is gradually being recognized,there are still deficiencies in the current research.First,the discussions on the formation factors and objects of empathy with nature are not yet deep and comprehensive enough.Second,there is a lack of systematic research methods and tools to measure and assess tourists' levels of empathy with nature.Moreover,further exploration is needed on how to cultivate and enhance tourists' empathy with nature through tourism activities.

1.5 Social Cognitive Theory

Social cognitive theory is one of the important theories in the field of psychology,and its core viewpoints were elaborated by the distinguished psychologist Bandura(1982).The theory posits that individual cognition plays a central role in analyzing and shaping individual behavioral choices.The emergence of behavior is not simply a result of an individual's passive acceptance and reaction,but rather a complex and dynamic process.In this process,the acting subject is not only guided by its internal cognitive framework but also widely absorbs and responds to the multi-dimensional influences of the environment in which it is situated.

According to social cognitive theory,most human behaviors are goal-oriented,with individual cognition playing a crucial

role(Li,Li,&Xiao,2021).Specifically,the depth of an individual's cognition of a particular matter is directly related to the quality of their behavior in that matter:higher cognitive levels lead to better behavioral quality,and vice versa(Koster&Langley,2013).This logic also applies to environmentally responsible behaviors,meaning that internal factors of individuals significantly influence whether they take environmentally responsible actions.In the field of tourism research,social cognitive theory has been widely used to analyze the internal motivations of tourists to choose sustainable tourism,as well as to explain and predict the diverse social behaviors of tourists(Li,Liu,&Yang,2024).

1.6 Cognition-Emotion-Behavior Theory

The"Cognition-Emotion-Behavior"theory originates from the ABC attitude model,proposed by Rosenberg(1960),which posits that consumer attitudes can be conceptualized into three components:cognition,emotion,and behavior.Individuals first form a cognition of an object,and this cognition triggers an emotion towards that object,ultimately leading to action under the joint influence of cognition and emotion.In short,cognition determines emotion,and emotion,in turn,leads to behavior,with human emotion acting as a mediator between cognition and behavior(Kuo,Cheng,Chang,Hu,&Lin,2021).

The application scope of the"Cognition-Emotion-Behavior"theory is extensive,encompassing consumers' decision-making processes in areas such as brand selection,educational services,hotel green initiatives,overall customer service experiences in ethnic restaurants,green marketing,and social media reviews(Zhang et al.,2023;Zheng et al.,2022).This theory holds high application value in tourism behavior research and plays a significant role in revealing the internal mechanisms of tourism behavior.Additionally,some studies treat cognition and emotion as parallel independent variables,focusing on their combined impact on satisfaction and loyalty(Chang et al.,2023).However,these studies overlook the potential intrinsic connections between cognition and emotion.

Therefore,this paper integrates tourists' environmental cognition,empathy with nature,and environmentally responsible behaviors into the same model and takes tourists' environmental cognition as a precursor variable for the generation of empathy with nature.It is hoped that by enhancing tourists' respect and sense of identification with the destination environment,the sustainable development of the tourism destination can be promoted.This model also takes emotion as the mediating variable between cognition and behavior,effectively compensating for the theoretical deficiencies in existing research and providing new ideas and methods for tourism behavior studies.

2 Research Hypotheses

2.1 Environmental Cognition and Environmental Responsibility Behavior

In the field of environmental behavior,environmental cognition reveals that an individual's actions in environmental protection are essentially the external manifestation of their internal environmental psychological structure,which can be decomposed into rational and irrational cognitions(Han,2021).Sun(2019)divided environmental cognition into two dimensions:environmental knowledge and environmental awareness,and found in his research that both personal environmental knowledge and environmental awareness have positive effects on green consumption behavior.Based on the purpose of behavior,domestic scholar Li Qiucheng categorizes tourists' environmentally responsible behaviors into two dimensions:environmental maintenance and environmental promotion.The former refers to the measures that tourists take proactively during their travels to reduce their negative impact on the scenic environment.The latter refers to the positive actions that tourists take to promote environmental protection in scenic areas(Li&Zhou,2014).

It can be seen that most scholars believe that the higher the level of environmental cognition of an individual,the more environmentally friendly their environmentally responsible behaviors are.Therefore,the following hypothesis is proposed:

H1:Environmental cognition positively influences tourists' environmentally responsible behaviors.

H1a:Environmental knowledge positively influences tourists' environmental maintenance behaviors.

H1b:Environmental knowledge positively influences tourists' environmental promotion behaviors.

H1c:Environmental awareness positively influences tourists' environmental maintenance behaviors.

H1d:Environmental awareness positively influences tourists' environmental promotion behaviors.

2.2 Environmental Cognition and Empathy with Nature

Existing studies generally agree that individual cognitive factors are the main variables affecting environmentally responsible behaviors.However, these studies largely overlook the impact of emotional factors.In psychology,cognition and emotion are closely linked.When facing environmental issues,cognition of the environment will trigger emotional responses in individuals.Tisdell's(2005)research found that tourists with a complete tourism environmental cognition system are more likely to develop a biophilic emotion.Yue et al.(2022)found that urban residents express positive or negative emotions based on their cognition of the quality of the human living environment.

Therefore, this paper believes that environmental cognition is the basis for triggering tourists' empathy with nature,and empathy with nature is the extension of environmental cognition.Based on this,the following hypothesis is proposed:

H2:Environmental cognition positively influences the generation of tourists' empathy with nature.

H2a:Environmental knowledge positively influences the generation of tourists' empathy with nature.

H2b:Environmental awareness positively influences the generation of tourists' empathy with nature.

2.3 Empathy with Nature and Environmental Responsibility Behavior

Emotion,as a key factor influencing behavior,has gradually received more attention in the study of environmentally responsible behaviors(Hu,Li,Chen,&Tian,2021).Social cognitive theory posits that individuals can actively integrate their own psychological

elements,such as emotions,engage in independent thinking and judgment,and ultimately crystallize into specific actions.Batson's(1991)empathy-altruism hypothesis suggests that pure altruism occurs when people empathize with individuals in distress.Pearce(2021)provides empirical evidence from a study of primary school students,indicating that empathy for nature,especially for endangered animals,can cultivate a sense of responsibility for protecting them by sharing their suffering,thereby promoting intentions for environmental protection behaviors.

Therefore,in the context of coastal tourism,this paper considers empathy with nature as an influencing factor on tourists' environmentally responsible behaviors and proposes the following hypotheses:

H3:Empathy with nature positively influences tourists' environmentally responsible behaviors.

H3a:Empathy with nature positively influences tourists' environmental maintenance behaviors.

H3b:Empathy with nature positively influences tourists' environmental promotion behaviors.

2.4 The Mediating Role of Empathy with Nature

Existing studies have confirmed the mediating role of emotion between individual cognition and behavior.Liu et al.(2020),based on the"Knowledge-Attitude-Behavior"model,pointed out that environmental knowledge itself does not directly lead to action but rather,through eliciting an emotional response in individuals and being internalized and accepted by them,more effectively promotes the generation of environmentally friendly behaviors.Chen et al.(2023),relying on the theories of communication ecology and the Stimulus-Organism-Response model,found that empathy with nature plays a significant mediating role in the relationship between the experience of environmental protection short videos,namely presence,perceived environmental education,online interaction,and consumers' intentions for low-carbon tourism behaviors.

Therefore,relying on the"Environmental Cognition-Empathy with Nature-Environmentally Responsible Behavior"theoretical framework,empathy with nature acts as a bridge connecting tourists' environmental cognition and environmentally responsible behaviors.Based on this,the following hypotheses are proposed:

H4:Empathy with nature mediates the relationship between environmental cognition and tourists' environmentally responsible behaviors.

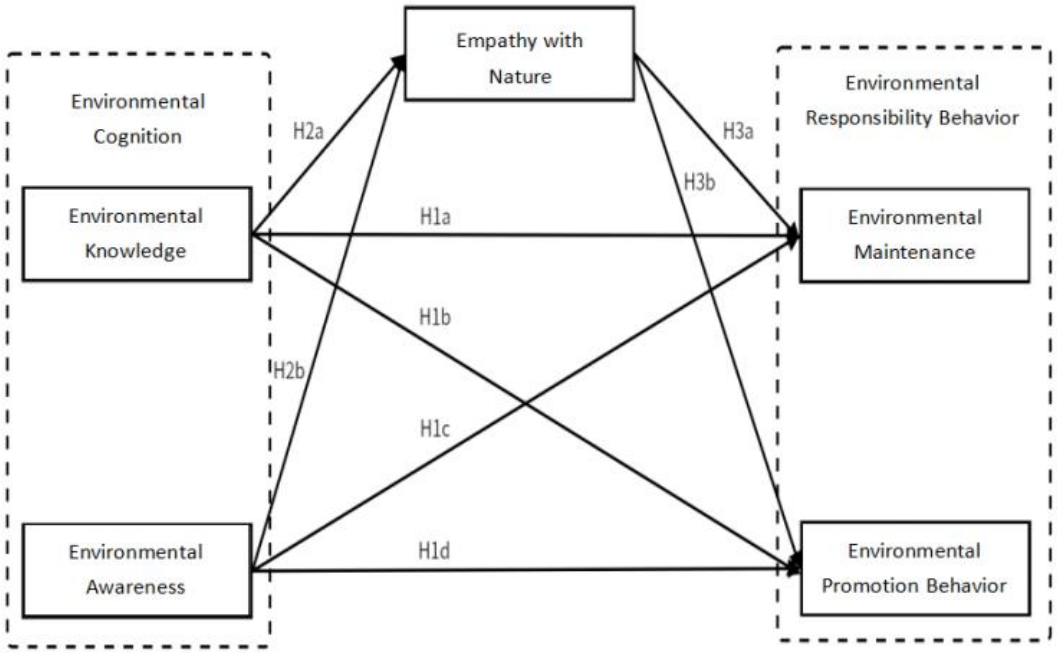
H4a:Empathy with nature mediates the relationship between environmental knowledge and tourists' environmental maintenance behaviors.

H4b:Empathy with nature mediates the relationship between environmental knowledge and tourists' environmental promotion behaviors.

H4c:Empathy with nature mediates the relationship between environmental awareness and tourists' environmental maintenance behaviors.

H4d:Empathy with nature mediates the relationship between environmental awareness and tourists' environmental promotion behaviors.

Fig.1:Research Model Diagram



3 Research Design and Data Analysis

3.1 Research Design

3.1.1 Case Selection

This paper mainly explores tourists' environmentally responsible behaviors in the context of coastal tourism.Considering the feasibility

of theoretical practical application and the actual situation of the research implementation,specific scenic spots such as Zhanqiao Scenic Area and Laoshan Scenic Area in Qingdao,Golden Beach Seaside Park and Yangma Island Scenic Area in Yantai,and Liugong Island and Swan Lake Tourist Resort in Weihai were selected as case study areas for the research.

3.1.2 Questionnaire Design

The survey questionnaire in this study mainly consists of two parts.The first part is composed of items related to the three variables of environmental cognition,empathy with nature,and environmentally responsible behaviors in the context of coastal tourism.The second part collects basic information about the tourists,including gender,age,education level,occupation,place of household registration,and monthly income.In this study,all items were measured using a 5-point Likert scale."1"represents strong disagreement,and"5"represents strong agreement,with higher scores indicating a higher degree of agreement..

Environmental cognition includes two dimensions:environmental knowledge and environmental awareness.Based on the research of Hong Dayong(2006),and combined with the research context of coastal tourist attractions,reasonable modifications were made to the survey questions,ultimately determining 10 survey items.The measurement of empathy with nature was designed based on the scale of Zong Yang et al.(2017),with a total of 6 survey items,which were appropriately modified according to the research context of coastal tourist attractions.Environmentally responsible behavior includes two dimensions:environmental maintenance behavior and environmental promotion behavior.Based on the research of Li Qiucheng et al.(2014)and Kong Yidan et al.(2019),and combined with the research context of coastal tourist attractions,reasonable modifications were made to the survey questions,ultimately determining 10 survey items.

3.1.3 Data Acquisition

The formal survey period was concentrated between July29,2024,and October7,2024.Each summer,the coastal areas frequently experience green tide algae blooms.These disasters not only cause serious damage to the coastal landscapes and ecological environments of the Shandong Peninsula but also occur during the peak tourism season,greatly reducing tourists' travel experiences.This leads to certain differences in environmental conditions of the same scenic spots during different periods.To explore tourists' environmental responsibility under different environmental conditions,the questionnaire collection period was relatively long.The author collaborated with friends who work as tour guides to distribute questionnaires face-to-face to visitors at the relevant scenic spots in the case study areas.In addition,the questionnaires were filled out anonymously,and the participants were solemnly promised that their responses would be strictly confidential.A total of 750 questionnaires were distributed during the research period,and 702 valid questionnaires were recovered,with a valid sample recovery rate of 93.6%.

3.2 Data Analysis

3.2.1 Descriptive Analysis of Sample Characteristics

The demographic characteristics of the survey samples include gender,age,place of household registration,monthly income,level of education,and occupation.The data description is shown in Table 1.

Table 1 Demographic Characteristics Statistics

Name	Category	Frequency	Percentage(%)
Gender	Male	412	58.69%
	Female	290	41.31%
Age	≤ 25 years old	158	22.51%
	26-35 years old	176	25.07%
	36-45 years old	131	18.66%
	46-60 years old	143	20.37%
	≥ 61 years old	94	13.39%
Place of Household Registration	Urban	408	58.12%
	Rural	294	41.88%
Monthly Income	2000 yuan and below	71	10.11%
	2001-5000 yuan	322	45.87%
	5001-10000 yuan	189	26.92%
	Above 10000 yuan	120	17.09%
Education Level	High School or Technical Secondary School and below	225	32.05%
	Bachelor's or Associate's Degree	315	44.87%
	Postgraduate or above	162	23.08%
Occupation	Civil Servant	38	5.41%
	Company Employee	159	22.65%

	Private Business Owner	88	12.54%
	Farmer	42	5.98%
	Teacher	70	9.97%
	Student	130	18.52%
	Freelancer	40	5.70%
	Retiree	38	5.41%
	Others	97	13.82%

3.2.2 Reliability and Validity Analysis

Using SPSS27.0 software for statistical analysis,the overall Cronbach's α coefficient for the questionnaire was 0.948,indicating a high level of internal consistency.The Cronbach's α values for each dimension ranged from 0.880 to 0.936,and the Corrected Item-Total Correlation(CITC) values for all items were greater than 0.5,suggesting that the measurement scale has high reliability.The overall reliability analysis of the questionnaire sample data is shown in Table 2.

Table 2 Reliability Analysis

Dimension	Item	CITC	Cronbach's α if Item Deleted	Cronbach'α Coefficient
Environmental Knowledge	HJZS1	0.827	0.921	0.936
	HJZS2	0.826	0.921	
	HJZS3	0.843	0.918	
	HJZS4	0.812	0.924	
	HJZS5	0.832	0.920	
Environmental Awareness	HJYS1	0.709	0.855	0.880
	HJYS2	0.705	0.856	
	HJYS3	0.713	0.854	
	HJYS4	0.717	0.853	
	HJYS5	0.717	0.853	
Empathy with Nature	ZRGQ1	0.795	0.914	0.928
	ZRGQ2	0.783	0.916	
	ZRGQ3	0.804	0.913	
	ZRGQ4	0.789	0.915	
	ZRGQ5	0.786	0.915	
	ZRGQ6	0.782	0.916	
Environmental Maintenance Behavior	HJWHXW1	0.734	0.869	0.892
	HJWHXW2	0.737	0.868	
	HJWHXW3	0.738	0.868	
	HJWHXW4	0.736	0.869	
	HJWHXW5	0.735	0.869	
Environmental Promotion Behavior	HJCJXW1	0.828	0.911	0.930
	HJCJXW2	0.816	0.914	
	HJCJXW3	0.815	0.915	
	HJCJXW4	0.811	0.915	
	HJCJXW5	0.811	0.915	

In terms of content validity,the core part of the measurement items in this study was derived from established scales that have been validated,and then carefully reviewed and confirmed by experts in the field.This process ensures that this study has high content validity.Structural validity includes convergent validity and discriminant validity,which are often tested using factor analysis,mainly relying on the KMO value and Bartlett's test of sphericity for judgment.

Table 3 KMO and Bartlett's Test of Sphericity

KMO Measure of Sampling Adequacy		0.955
Bartlett's Test of Sphericity	Approximate Chi-Square	13613.420
	Degrees of Freedom	325.000
	Significance	0.000

Table 3's test results play a crucial guiding role in subsequent analyses.The KMO test value is as high as 0.955,which is significantly greater than 0.9,fully indicating that these data are extremely suitable for factor analysis.Additionally,the significance P-value of Bartlett's test of sphericity is less than 0.05,indicating statistical significance.Based on this,the null hypothesis is rejected,meaning that there is correlation among the variables,thus determining that factor analysis is valid and that these data are suitable for factor analysis

operations.Subsequently,confirmatory factor analysis was conducted on the model data using Amos 28.0 software to assess the scale's convergent validity and discriminant validity.

Table 4 Model Fit Indices

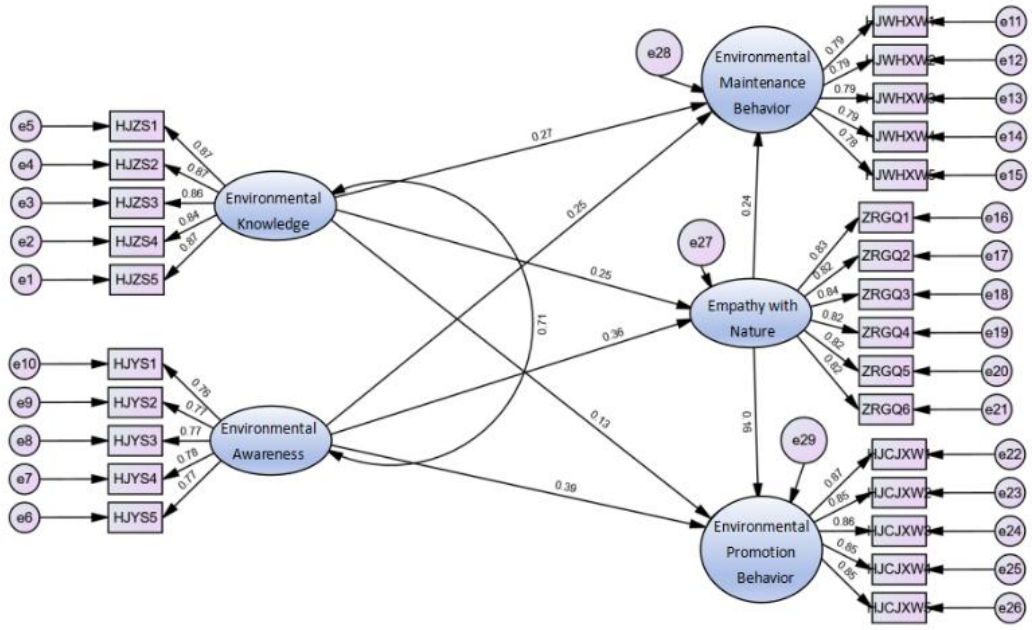
Indicator	CMIN	DF	CMIN/DF	RMSEA	GFI	CFI	NFI	IFI	TLI
Excellent	-	-	1-3	<0.05	>0.9	>0.9	>0.9	>0.9	>0.9
Good	-	-	3-5	<0.08	>0.8	>0.8	>0.8	>0.8	>0.8
Fit	528.209	289	1.828	0.034	0.945	0.982	0.962	0.982	0.980

Table4 presents the model's fit indices.The model's CMIN is 528.209,with a degrees of freedom(DF)of 289,resulting in a CMIN/DF ratio of 1.828,which is less than 3.The RMSEA is 0.034,which is less than 0.05.Additionally,the GFI,CFI,NFI,IFI,and TLI all exceed 0.9,reaching excellent levels.Based on this comprehensive analysis,all indices meet their respective standards,indicating that the model has a good fit.

3.2.3 Hypothesis Testing

Following an extensive review of literature and data validation,and in conjunction with the research hypotheses of this study,this paper constructs a structural equation model(SEM)that includes five latent variables and 26 observed variables based on the theoretical model shown in Fig.1.This model was built using AMOS 28.0 software, as depicted in Fig.2.

Fig.2 Structural Equation Model Diagram



Note: The structural equation model (SEM) was built using AMOS 28.0 software, included five latent variables and 26 observed variables based on the theoretical model shown in Fig.1.

The model's CMIN is 563.781,with 290 degrees of freedom(DF),resulting in a CMIN/DF ratio of 1.944,which is less than 3.The RMSEA is 0.037,which is less than 0.08.The GFI,CFI,NFI,IFI,and TLIall exceed 0.9,reaching excellent levels.In summary,all indices meet the criteria,indicating that the model has a good fit.

Path analysis was conducted on 702 data samples using AMOS 28.0 software.This involved comprehensively considering the standardized path coefficients between each latent variable in the measurement model,as well as the significance levels of the P-values.The results,as shown in Table 3.5,confirmed all eight hypotheses regarding direct effects.

Table 3.5 Direct Effect Test

Path Relationships	Unstandardized Path Coefficient	Standardized Path Coefficient	S.E.	C.R.	P	Conclusion
H2a	0.202	0.253	0.044	4.682	***	Supported
H2b	0.374	0.357	0.059	6.304	***	Supported
H3a	0.233	0.240	0.041	5.616	***	Supported
H3b	0.201	0.157	0.055	3.687	***	Supported
H1a	0.210	0.265	0.042	4.991	***	Supported
H1b	0.136	0.130	0.056	2.448	0.014	Supported
H1c	0.254	0.250	0.057	4.442	***	Supported
H1d	0.521	0.389	0.078	6.657	***	Supported

Note：***，p<0.001

This paper employs the Bootstrap method,setting the number of Bootstrap samples to 2000,with a confidence level of 95%.When the

confidence interval does not include 0,and the two-tailed significance level P-value is less than 0.05,the mediating effect is significant.The results of the mediation effect test are shown in Table 3.6,from which it can be seen that empathy with nature has a significant mediating effect between the two dimensions of environmental cognition and the two dimensions of environmentally responsible behaviors.

Table 3.6 Mediation Effect Test of Nature Empathy

Path Relationships	Direct Effect	Indirect Effect	Bias-corrected（95%）		p	Conclusion
			Lower Bounds	Upper Bounds		
H4a	0.265(***)	0.061	0.031	0.107	0.000	Partial Mediation
H4b	0.130(0.014)	0.040	0.013	0.074	0.003	Partial Mediation
H4c	0.250(***)	0.086	0.045	0.138	0.001	Partial Mediation
H4d	0.389(***)	0.056	0.019	0.106	0.003	Partial Mediation

Note:：The values in parentheses are p-values，***，p<0.001

4 Research Results

4.1 Environmental Cognition Positively Influences tourists' environmentally Responsible Behaviors

Both environmental knowledge and environmental awareness have shown a positive driving effect on tourists' environmental maintenance behaviors and environmental promotion behaviors.Specifically,in terms of environmental maintenance behaviors,environmental knowledge has a more significant influence compared to environmental awareness.This implies that to effectively stimulate tourists' environmental maintenance behaviors,the key lies in deepening their cognition and understanding of coastal tourism environmental issues,and expanding the breadth and depth of their environmental knowledge.At the level of environmental promotion behaviors,environmental awareness plays a more central role.Therefore,to encourage tourists to actively participate in environmental protection,it is necessary not only to guide them to pay enough attention to coastal tourism environmental issues but also to commit to enhancing their environmental awareness,making it an internal driving force.

4.2 Environmental Cognition Positively Influences Tourists' Empathy with Nature

Within the framework of environmental cognition,both environmental knowledge and environmental awareness have a positive impact on empathy with nature.This finding not only confirms the preset hypotheses but also aligns with the views of previous research by Tisdell et al.(2005)that environmental cognition significantly promotes tourists' ecological emotions.The study further found that among environmental knowledge and environmental awareness,environmental awareness has a more significant impact on empathy with nature.This may be because environmental awareness involves the individual's identification with environmental values and emotional investment.When tourists are actually in the space of the tourist attraction,their overall environmental cognition of the destination becomes a key factor affecting tourists' emotions.This change in the spatial environment can trigger emotional responses among tourists,that is,"feelings arise from the scenery.Therefore,by enhancing tourists' environmental knowledge and environmental awareness,their empathy with nature can be stimulated,thereby promoting the development of sustainable tourism.

4.3 Empathy with Nature Positively Influences tourists' environmentally Responsible Behaviors

Empathy with nature has a significant positive impact on both environmental maintenance behaviors and environmental promotion behaviors.Applying the research context to coastal tourism reveals the important role of empathy with nature in specific tourism environments.At the same time,the study also refines the impact of empathy with nature on different types of environmentally responsible behaviors,and compared to environmental promotion behaviors,the impact of empathy with nature on environmental maintenance behaviors is more significant.This indicates that when tourists empathize with the natural environment,they are more inclined to maintain the health and beauty of the environment by complying with the regulations of the scenic area.Tourists with higher levels of empathy with nature are more likely to perceive environmental issues and think empathetically.

4.4 Empathy with Nature Acts as a Mediator between Environmental Cognition and Environmentally Responsible Behaviors

Tourists' environmental knowledge and awareness significantly influence their environmental maintenance and promotion behaviors in coastal scenic areas,catalyzed by empathy with nature.This finding aligns with the earlier research by Liu et al.(2020)based on the "Knowledge-Belief-Action"model,which emphasizes that environmental knowledge is not a direct driver of action but needs to be activated and internalized through the emotional level to be more effectively translated into environmental practices.When tourists arrive at coastal scenic areas,their environmental cognition naturally triggers a series of emotional responses.These emotions,especially empathy with nature,become the proximal factors driving them to adopt environmentally responsible behaviors. After the emotional stage,individuals ultimately enter the behavioral stage.At this stage,tourists will take corresponding environmentally responsible behaviors based on their environmental cognition and emotional responses.

5 Conclusion and Discussion

This study focuses on coastal tourist attractions and,from the dual perspectives of cognition and emotion,deeply analyzes the internal mechanisms and pathways through which environmental cognition and empathy with nature influence tourists' environmentally responsible behaviors.The study found that tourists' environmental cognition and empathy with nature have a significant positive impact on their

environmentally responsible behaviors.Environmental cognition has a significant positive impact on tourists' empathy with nature,and empathy with nature plays a partial mediating role in the relationship between environmental cognition and environmentally responsible behaviors.Based on this,the paper proposes management insights for coastal tourist attractions,including strengthening environmental education and publicity to enhance tourists' environmental cognition;cultivating tourists' empathy with nature to promote emotional resonance;focusing on tourist participation to guide the implementation of environmentally responsible behaviors;and considering demographic characteristics to develop differentiated management strategies.

However,there are some aspects in this study that need improvement.Due to the limitations of research time and the researcher's level,when conducting empirical research on the influencing pathways of tourists' environmentally responsible behaviors in coastal tourist attractions,this study only selected environmental cognition and empathy with nature from the main categories of cognitive and emotional factors for analysis,failing to fully cover other potentially important influencing factors.Therefore,follow-up research can introduce more relevant variables to construct a more comprehensive and detailed research model,thereby revealing the internal mechanisms of tourists' environmentally responsible behaviors more deeply.At the same time,more diverse methods can be attempted,such as in-depth interviews,field observations,and text analysis,to capture the inner thoughts and behavioral manifestations of the respondents more directly and truly through qualitative research methods,thereby improving the accuracy and credibility of the research results and providing more precise guidance for decision-making.

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