

Research article

Sport tourist perceptions of destination image and revisit intentions: An adaption of Mehrabian-Russell's environmental psychology model

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ABSTRACT

In environmental psychology literature, an individual's perception of the surroundings leads to subsequent behaviors. In this regard, small-scale sport events (SSE) have been used as a marketing tool for tourism development. However, how SSEs are leveraged to improve destination image (DI) for tourists has not been fully understood. Building on Mehrabian-Russell's environmental psychology model, this study examined the relationship between the SSE environmental stimuli and revisit intentions through the sequential mediation of cognitive and affective DI. Data from the 423 respondents were collected from 2023 Wuxi Marathon held in Wuxi, China. Structural equation modeling was employed to analyze the hypothesized framework. The results indicated that the SSE environmental stimuli were positively associated with both cognitive and affective DI, which were positively correlated with revisit intentions. The applicability of the serial mediation of cognitive and affective DI within the relationship was confirmed. This study contributes to the sport and tourism literature by extending the applicability of Mehrabian and Russell's model to SSE settings and identifying the serial mediating effects of cognitive and affective DI.

1. Introduction

In recent decades, hosting sport events has become a widely used strategy among destination marketers promoting tourism development [1–4], as tourists who travel to participate in sport events tend to stay longer and spend more money in the host destination [5]. For example, more than 1.4 million people traveled to Qatar during the 2022 FIFA World Cup, which generated a total economic impact of \$200 billion. Because of this salience, examining how sport events can attract tourists received significant attention from sport and tourism researchers [6–8]. Previous studies have identified destination image (DI) as a critical predictor of various behavioral outcomes, such as visit intentions [4,9,10], word-of-mouth [6,11], and event support [12,13]. DI describes a tourist's overall impressions of a destination and plays a crucial role in decision making of active event sport tourists [7]. These studies have made valuable contributions to understanding the relationships among sport events, DI, and tourists' behavior. However, two research gaps in the literature remain to be addressed.

Prior research on sport tourism has predominantly been conducted in the context of hallmark event, such as the Olympic Games and FIFA World Cup [1,3,4,9]. For instance, Gibson et al. demonstrated that tourists' DI of Beijing significantly improved following the

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2008 Beijing Olympics, which enhanced their revisit intentions [4]. While these hallmark events are effective in strengthening DI of host cities, they are neither applicable nor affordable to most destinations which are struggling to attract visitors to promote economic recovery after the COVID-19 pandemic [1]. As an alternative, some scholars have highlighted the effectiveness of small-scale sport events (*hereafter* SSEs), such as marathons and cycling races, to attract tourists [5,14,15]. SSEs are held with existing resources, making them more manageable for most destinations [7,16,17]. Unlike hallmark events, SSEs have limited global visibility and reputation [14]. Taks et al. argued that SSEs can serve as platforms through which the distinctive characteristics of host destinations are strategically leveraged to boost sport tourists' DI and revisit intentions [17]. However, existing studies have primarily assessed the change in tourists' perceived DI before and after attending SSEs. Research focused on understanding the antecedents influencing DI through the host of SSEs remains relatively limited.

In the tourism literature, DI is generally conceptualized as multidimensional, consisting of both cognitive and affective components [1,18,19]. However, most sport event research constructs DI as unidimensional [6,7,20]. Because cognitive and affective DI are internally connected and reflect a tourist's psychological reaction to the environment [18,21], examining them together improves our understanding of the relationship between environmental stimuli and behavioral responses.

Mehrabian-Russell's [22] environmental psychology model (EPM) provides a parsimonious framework to explain tourists' DI perceptions and behavioral responses to environmental stimuli [5,18,23]. Drawing on the EPM, the current study aims to examine the relationship between tourists' perceptions of SSE environmental stimuli (SES) and their intentions to revisit the destination. Furthermore, it assessed the mediating roles of cognitive DI (CDI) and affective DI (ADI) within the relationship between the SES and tourists' revisit intention. In doing so, this study accommodated calls from previous studies to examine the external determinants of a destination's post-visit image [18,24]. We drew on our findings to further explain how destinations can build their DI and attract tourists by hosting SSEs and to present the theoretical and managerial implications for sport and tourism researchers and marketers.

2. Literature review

2.1. Destination image

Since it was introduced to tourism research, DI as a key predictor of tourists' attitudinal and behavioral responses has received extensive attention from scholars in various disciplines, such as hospitality and tourism management, marketing, and sport management [6,7,18,25]. While substantial studies contribute to a comprehensive understanding of DI, they also defined DI inconclusively. A review of the literature showed that DI was defined according to the priorities of specific disciplines and contexts [18,24,26,27]. Of these definitions, Crompton's definition of DI, which calls it "the sum of beliefs, ideas, and impressions that a person has of a destination" (p. 18) [26], was widely cited as it captured the idea of a tourist's holistic impressions of a destination.

The diverse definitions of DI led to the development of multifaceted approaches to conceptualizing and measuring DI [23,24,27,28]. Earlier studies predominantly measured DI as a unidimensional factor that was either cognitive or affective [4,7,20,29]. The cognitive dimension represents a tourist's knowledge and interpretation of the attributes of a specific destination. The affective dimension refers to a tourist's overall feelings and emotional responses to the destination's attributes. To capture a holistic meaning of DI, more recent research has constructed DI as multidimensional, including both cognitive and affective dimensions [19,25]. Examining both CDI and ADI, which are interrelated in describing how a tourist reacts to a destination environment, allows us to better understand the connection between environmental stimuli and tourists' behaviors. Hence, this study adopted a multidimensional definition that incorporates CDI and ADI.

2.2. Small-scale sport event

Small-scale sport events are recurring sport events that are smaller in size and receive less media attention and global awareness than their hallmark counterparts [16,17]. SSEs are organized with host destinations' existing resources, facilities, and services, which are more sustainable and manageable than the resources needed for hallmark events. Typical SSEs include regional marathons, triathlons, and cycling races [7,16,30], in which visitors are primarily players rather than spectators. The courses of these SSEs often incorporate some tourist attractions of the host destinations to leverage DI [14]. Participants will pass by those attractions during events. Because of the compatibility between SSEs and the tourism environment and atmosphere of host destinations, many scholars have argued that SSEs can be effective tools to enhance tourists' interest and destinations' development.

Previous research has suggested the effectiveness of SSEs in promoting the development of sport tourism [6,7,14,30]. Scholars have suggested that hosting SSEs annually could consistently attract sport tourists to the destination. For instance, in a study of two triathlons in Germany, An and Yamashita revealed that most participants had attended the events several times and extended their stay at the host destination by one or two additional days [6]. Similarly, Kaplanidou and Gibson found that senior sport tourists often revisit host destinations even after the sport events have concluded [42]. However, this body of research focused on event-related psychological and behavioral outcomes such as perceived social impact, subjective well-being, and event loyalty [7,30,31]. Despite some anecdotal evidence indicating that sport tourists considered the attractions and environments of host destinations before making decisions, research on the environmental stimuli that influence the formation of DI during the post-event stage is relatively scarce. This study seeks to address this gap by examining the environmental stimuli of SSEs that may influence the formation of DI.

2.3. SSE environmental stimuli

In the tourism literature, Baloglu and McCleary [24] and Beerli and Martín [18] proposed environmental stimuli as key determinants of tourists’ DI formation and travel decisions. In a recent literature review, Yilmaz and Yilmaz demonstrated that tourists’ perceptions of the physical environment during their trip most strongly affected their post-visit DI formation [25]. Therefore, tourists’ perceptions of the environmental stimuli of a sport event, such as its facilities, ambiance, and the services received, have strong relationships with DI. Similarly, sport management scholars have found that physical aspects of the environment are significant predictors of spectators’ psychological and behavioral responses to events [32–34]. This line of research produced the term “sportscape” to describe spectators’ perceptions of key stimuli in sport venues, including the scoreboards, seat comfort, and aesthetic design [33, 34]. Although studies on the sportscape exist, the environmental stimuli of SSEs have yet to be fully understood.

Previous research argues that SSEs, which are usually hosted outdoors, are distinct [7,16,30,35]. For example, the courses of marathons and cycling races are often designed to run alongside city centers and state parks. Hence, the sportscape concept is inappropriate to describe the SSE environment. In this study, the SES include the visually perceived physical environments of the host destination that are incorporated alongside a marathon event. The existing research on the SES is scarce [36–39]. By examining cyclists’ perceptions of the route environment of a certain destination, Qin identified a three-dimensional construct of cycling environmental preferences, including sensitivity, absorption, and relevance [39]. Sensitivity refers to the assessment of the visual diversity of physical environmental components, such as buildings, parks, and roads [38]. Absorption represents individuals’ subjective reactions to their interactions with external environments. Relevance describes how the perceived environmental stimuli contribute to specific human activities, such as cycling, driving, and running. Bimbao and Qu found that cyclists’ sensitivity and the relevance of the external environment positively influenced their satisfaction and cycling frequency [36]. Qin validated the use of the three dimensions as a second-order construct to measure cyclists’ perceptions of external environments when cycling [39]. This study adopted the second-order factor construct to describe the SES because the research context of this study is a marathon event that has a similar route as cycling races.

3. Hypothesis development

To address the research purposes, a framework was established based on the EPM (see Fig. 1) to examine the relationships among the SES, DI, and revisit intention. CDI and ADI were proposed to sequentially mediate the relationship between the SES and revisit intentions.

3.1. Model of environmental influence

Building on the stimuli-organism-response theory, Mehrabian and Russell proposed EPM to explain how the external environment can be designed to trigger expected human behaviors [22]. Specifically, people will perceive and interpret the environmental stimuli they experience in stores, stadiums, or workplaces [19,32,33,40]. These cognitions and emotions will then direct specific behavioral responses. EPM was first applied to investigate how specific stimuli, such as music, odors, and decorations, in retail stores influence consumers’ attitudes toward the stores or products and their buying behaviors. Now, EPM has become one of the prevalent theoretical foundations for research on sport events and tourism. Stemming from EPM, sport event studies have empirically examined the impact

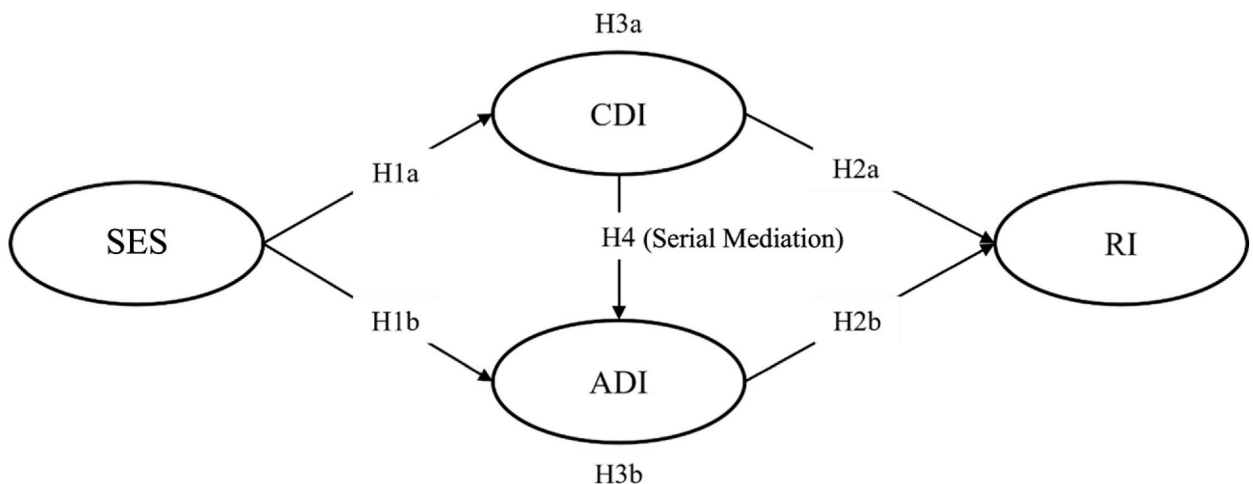


Fig. 1. Hypothesized relationships based on Mehrabian-Russell’s environmental psychology model.
 Note. SES = SSE environmental stimuli; CDI = Cognitive destination image; ADI = Affective destination image; RI = Revisit intention. H1a = SES → CDI; H1b = SES → ADI; H2a = CDI → RI; H2b = ADI → RI; H3a = SES → CDI → RI; H3b = SES → ADI → RI; H4 = SES → CDI → ADI → RI.

of the sportscape on spectators' psychological reactions and event attendance [32–34]. The existing sport tourism research has assessed the relationships among service quality, destination experience, DI, and revisit intentions [19,20,28]. Therefore, EPM is appropriate to support the hypothesized relationships among the SES, DI, and revisit intention, which were developed in the context of a regional marathon event.

3.2. SES influencing DI

According to Baloglu and McCleary's conceptual framework, sport participants' event experiences will strengthen their evaluations of the overall trip and their DI [24]. That is, a sport event provides its participants with a context for relaxation and enjoyment that strengthens their emotional connection to the event and the host destination [7,30]. This enhanced emotion then improves participants' perceptions of the urban, historic, and natural environments they experienced at the host destination, which contributes to the formation of DI [18,24].

This proposition is especially suitable for assessing the impact of SES, such as those of marathon events and cycling races, on DI. SSE routes are often designed to incorporate the host destinations' urban, historic, and natural attractions [7,14,30]. Sport tourists experience those attractions while participating in SSEs. Previous studies have shown that the environmental stimuli of host destinations are among the key factors that influenced sport tourists' selection of SSEs and their attitudes toward events and host destinations in the post-event stage [6,14,20,35]. For instance, An and Yamashita found that the quality of a marathon route positively influenced sport tourists' ADI through their event attitudes [6]. However, these studies employed a unidimensional semantic scale to measure sport tourists' perceptions of the environment and DI. A semantic scale cannot specify key aspects of SES, limiting the implications of the results. Therefore, we posit that sport tourists' perceptions of SES when participating in an SSE will increase their CDI and ADI.

H1a. When participating in an SSE, sport tourists' perceptions of SES are positively associated with CDI.

H1b. When participating in an SSE, sport tourists' perceptions of SES are positively associated with ADI.

3.3. DI influencing revisit intention

The impact of DI on tourists' behavioral intentions, such as visit, recommendation, and revisit intentions, toward a given destination remains a prevalent topic in the tourism literature [1,23]. Revisit intention describe a tourist's willingness to visit a destination again [20]. In particular, sport tourists' intentions to revisit a destination as non-sport visitors represent the potential long-term economic impact of sport events on destination development [41]. Therefore, sport tourism researchers need to understand how to increase tourists' revisit intentions.

Previous studies on sport events yielded consistent results demonstrating the pivotal role that event experience plays in predicting sport tourists' event attendance [1,10,20]. This line of research proposed that sport tourists' direct experience of the destination and sport event together construct a strong, positive CDI that motivates their behavioral intentions [7,42,43]. For example, Kaplanidou et al. found that sport tourists' CDI and event experience increased their intention to participate in the Boston Marathon in the future [7]. Similar findings were also observed in a triathlon held in Germany [6]. However, these studies primarily confirmed the positive impact of CDI on revisit intention, while the influence of ADI was neglected. From a theoretical perspective, DI is generally understood to consist of both cognitive and affective components [24,27]. A recent literature review suggested the power of combined CDI and ADI to predict tourists' behavioral intentions and called for more studies to comprehensively examine DI's influence on tourists' behaviors. In response, this study hypothesized that.

H2a. Sport tourists' CDI is positively associated with revisit intention.

H2b. Sport tourists' ADI is positively associated with revisit intention.

3.4. The mediating effect of DI

In the preceding discussion, the direct paths from the SES to CDI and ADI and, in turn, to revisit intention were hypothesized based on the existing sport and tourism literature. The dynamic nature of a person's psychological states and behaviors leads us to propose the existence of an indirect effect of the SES on revisit intention through CDI and ADI. This indirect effect is consistent with the EPM framework, which posits that tourists' perceptions of a destination, such as its external stimuli, will motivate their intention to visit or revisit the destination through a favorable DI [18,24]. However, limited studies have statistically tested the mediating effect of DI, particularly in the context of sport event tourism [4,6,20,43]. Of these, Gibson et al. found that tourists' CDI mediated the relationship between their past travel experiences and intention to travel to China during the 2008 Olympic Games [4]. An and Yamashita empirically examined sport tourists' overall evaluation of a marathon event and found that it indirectly influenced their revisit intention through ADI [6].

According to appraisal theory [44], a tourist's ADI, as their emotional response to a destination, is generated based on their cognitive evaluation of the physical environments or experiences of the destination. Much of the tourism literature agreed that a tourist's CDI positively influenced their ADI [19,23,24]. This suggests a serial mediation model of CDI and ADI that has not yet been comprehensively examined. For instance, Qiu et al. identified a serial mediating effect of CDI, ADI, and place attachment in the relationship between tourists' perceptions of destination source credibility and environmentally responsible behavior [19]. However,

they found that the serial mediating effect of CDI and ADI was insignificant. Zhang et al. reported that CDI and ADI sequentially mediated the impact that people’s perception of destination messages exerted on destination selection [27]. We postulated that sport tourists’ perceptions of SES would indirectly influence their intentions to revisit the host destination by strengthening their CDI and ADI. Therefore, we hypothesize that.

H3a. Sport tourists’ CDI mediates the relationship between the SES and revisit intention.

H3b. Sport tourists’ ADI mediates the relationship between the SES and revisit intention.

H4. The association between event tourists’ perceptions of the SES and revisit intention is sequentially mediated by CDI and ADI.

4. Methods

4.1. Research setting

This study was conducted using the Wuxi Marathon, a marathon event hosted in Wuxi, a city in eastern China. The marathon event was chosen as the research context because most of its participants were leisure runners, the primary consumers of sport tourism [7,

Table 1
Standardized factor loadings, construct reliability, and average variance extracted for all scales.

Constructs/Items	Factor loading	CR	AVE
Environmental sensitivity		0.83	0.62
I can see a variety of landscapes alongside the route.	0.78		
I can see many scenic attractions alongside the route.	0.81		
I can see many sociocultural landscapes alongside the route.	0.77		
Environmental absorption		0.88	0.72
I enjoy running across many various scenic attractions.	0.82		
The environment makes me feel relaxed when running.	0.85		
The environment makes me feel excited when running.	0.88		
Environmental relevance		0.90	0.75
Roads are wide enough for running.	0.84		
Roads are very clean.	0.94		
Road signages are properly designed for the event.	0.81		
SES		0.86	0.68
Environmental sensitivity.	0.94		
Environmental absorption.	0.85		
Environmental relevance.	0.66		
Infrastructures		0.93	0.77
The city has various shopping facilities.	0.90		
The city has quality accommodation.	0.87		
The city has good value for money.	0.85		
The city is safe.	0.88		
Atmosphere		0.92	0.80
I feel peaceful when staying in the city.	0.82		
I feel relaxing when staying in the city.	0.93		
The city is a good place to rest.	0.92		
Cultural environment		0.89	0.73
The city has a lot of cultural attractions.	0.83		
The city has many interesting cultural activities.	0.92		
It is nice to learn about the customs of the city.	0.81		
Natural environment		0.94	0.83
The city has variety of fauna and flora.	0.84		
The city has many beautiful landscapes.	0.93		
The city has many beautiful natural parks.	0.97		
CDI		0.91	0.70
Infrastructures and socioeconomic environment.	0.95		
Atmosphere.	0.88		
Cultural environment.	0.73		
Natural environment.	0.77		
ADI		0.94	0.81
Gloomy – Cheerful.	0.92		
Sleepy – Arousing.	0.91		
Unpleasant – Pleasant.	0.90		
Distressing – Relaxing.	0.86		
Revisit intention		0.96	0.90
I would like to revisit Wuxi in the next two years.	0.96		
I plan to revisit Wuxi in the next two years.	0.98		
I will make an effort to revisit Wuxi in the next two years.	0.90		

Note. N = 423; All factor loadings were significant ($p < 0.01$); CR = Construct reliability; AVE = Average variance extracted.

30]. According to 2023 RunChina's annual report, before the COVID-19 pandemic, marathons were the most popular sport event type that attracted travelers in China. In 2023, 67 marathon events will be held, and they are expected to attract more than 7 million visitors.

The Wuxi Marathon is one of China's few gold-label marathon events. Around 30,000 runners participated in the event this year. It is designed with a "Marathon + Tourism" portfolio for destination development and is known for its scenic route. The route starts at the Wuxi Sport Center in uptown Wuxi and ends at the Wuxi Taihu International Expo Center downtown. Participants ran past and through many tourist attractions of Wuxi, such as Lihu Lake, Yuantouzhu Historic Town, and Gonghuawan Wetland Park. These attractions together represent Wuxi's urban, natural, and cultural image. To stimulate tourism development, Wuxi Marathon participants and their families can enjoy half-price tickets to many of Wuxi's tourist attractions by showing their participants' certificates.

4.2. Data collection

This study aimed to examine whether sport tourists (i.e., event participants) perceive environmental stimuli when participating in an SSE and how their perceptions influence DI and revisit intention. We used purposive sampling to recruit respondents. Eligible respondents needed to meet the following criteria: (a) 18 years old or older; (b) not living in Wuxi; and (c) participating in the Wuxi Marathon. The three criteria ensured the recruitment of appropriate respondents, effectively addressing the research objective of examining the impact of tourists' perceptions of SES on their intentions to revisit the destination. Five graduate students waited at the rest area near the finish line of the event and screened potential respondents based on these criteria. People who satisfied the criteria were then invited to fill out a questionnaire. In total, 423 respondents completed the questionnaire, generating a final sample size of 423 responses for further analysis.

Among the 423 respondents, 61.2 % were male and 38.8 % were female. The respondents had a mean age of 38.20 years old (*S.D.* = 9.04). Most respondents (84.2 %) held at least a bachelor's degree, and 72.3 % of the respondents lived within 3 h' travel of the host city. The sample is representative of the overall participants in the Wuxi Marathon, with over 60 % being male. The majority of participants were aged between 35 and 44 years old and originated from adjacent provinces [45].

4.3. Measures

The items used to measure the constructs of the SES, CDI, ADI, and revisit intentions were adapted from well-established scales in English. As this study was conducted in China, back-translation was employed to translate the items from English to Chinese. The respondents answered the questions on a 7-point Likert scale ranging from 1, "strongly disagree," to 7, "strongly agree".

The SES were measured with Qin's nine-item scale of cycling landscape preference [39]. Modifications were made to adapt it to the marathon running context. CDI was measured with the 13-item scale validated by Kaplanidou et al. [7]. ADI was measured with four items adopted from Hallmann et al. — "Gloomy–Cheerful," "Sleepy–Arousing," "Unpleasant–Pleasant," and "Distressing–Relaxing"—on a 7-point semantic differential scale [20]. The construct of *revisit intention* was measured with Brown et al.'s three-item scale [10]. The descriptions of all items are provided in Table 1.

4.4. Data analysis

A skewness–kurtosis test for the multivariate normality of the measurements was performed using SPSS 26.0 before structural equation modeling (SEM). The assumption of normal distribution is affirmed when the absolute value of skewness is less than 2.00 and that of kurtosis is below 7.00 [46].

SEM was then employed to assess the hypothesized framework with the Mplus 8.4 statistical package. Anderson and Gerbing's two-step modeling approach was adopted to guide the SEM analysis [47]. The measurement model was tested via confirmatory factor analysis (CFA) with the maximum likelihood estimation to assess the construct's reliability and validity. The data–model fit was identified with combined goodness-of-fit (GoF) indices [46,48], including whether the normed chi-squared statistic (χ^2/df) was less than 3.00, the comparative fit index (CFI) was above 0.95, the root mean square error of approximation (RMSEA) was below 0.06, and the standardized root mean residual (SRMR) was below 0.05. A construct is considered reliable when the composite reliability (CR) is above 0.70 and the factor loading of each item is above the 0.60 threshold. For convergent validity, the value of average variance extracted (AVE) should be 0.50 or higher [49]. The discriminant validity is confirmed when the square root values of AVE surpass the correlations between any paired constructs. Then, a structural model was developed to examine the hypothesized paths of influence.

To examine the mediating effect of CDI and ADI, we applied a nonparametric bootstrapping procedure (5000 rounds of re-sampling) to calculate the indirect relationship between the SES and revisit intention through CDI and ADI. The bootstrapping approach is especially effective to test mediating effects because it can avoid the normality assumption of the sampling distribution [50]. A bias-corrected confidence interval of 95 % (95 % CI) that excludes zero suggests the presence of a mediator.

5. Results

5.1. Testing the data normality

The results showed that the skewness values of the measurements ranged from -1.71 to 0.57 , and the kurtosis values were between -4.98 and 6.51 . Therefore, the skewness–kurtosis test indicated that the abnormal distributions were not large enough to affect the

SEM results.

5.2. Testing the measurement model

The CFA results revealed that the GoF met the recommended cutoff values: $\chi^2 (762.03)/df (337) = 2.26$; CFI = 0.96; RMSEA = 0.05; and SRMR = 0.05. Together, these results indicate that the measurement model fits the data well. Table 1 showed that all constructs were properly identified as all measured variables had significant factor loadings that ranged from 0.66 to 0.97 on the corresponding latent variables. The CR estimates of all constructs exceeded 0.70, supporting the construct reliability. The convergent validity of the multi-item scales was confirmed as the AVE values were between 0.62 and 0.83. In addition, as reported in Table 2, the square root of AVE for each construct surpassed the paired correlation coefficients, suggesting adequate discriminant validity. Overall, the measurement model was suitable for further analysis.

5.3. Testing the structural model

The structural model yielded a good GoF ($\chi^2 (765.37)/df (338) = 2.25$; CFI = 0.96; RMSEA = 0.06; SRMR = 0.05), indicating that the model was properly identified by the data. Table 3 presents the hypothesized model with standardized path coefficients, which explained 42.2 % of the total variance in sport tourists' revisit intentions. Regarding the direct paths, the associations between the SES and both CDI ($\beta = 0.39, p < .01$) and ADI ($\beta = 0.49, p < .01$) were significant, confirming H1a and H1b. These results suggest that the perceived environment during event participation positively influenced sport tourists' CDI and ADI. The path from CDI to revisit intention was significant ($\beta = 0.51, p < 0.01$), supporting H2a. The positive relationship between ADI and revisit intention ($\beta = 0.26, p < 0.01$) was also significant, supporting H2b. The confirmation of the two hypotheses suggests that sport tourists' positive CDI and ADI enhance their intention to revisit the destination where they participated in sport events.

5.4. Testing the mediating effect

Table 3 shows that the indirect path coefficient from the SES to revisit intentions via CDI was significant ($\beta = 0.20, p < 0.01$). The 95 % CI for the indirect effect excluded zero [0.12, 0.35], supporting H3a. The significance implies that sport tourists' SES positively influence their revisit intention when they recognize a favorable DI. Similarly, H3b was confirmed by the significant indirect effect of ADI in the relationship ($\beta = 0.12, p < 0.01$); the 95 % CI also excluded zero [0.08, 0.23]. The results also indicated that CDI and ADI exerted serial mediation ($\beta = 0.03, p < 0.05, 95\% \text{ CI } [0.02, 0.08]$), supporting H4. These results imply that sport tourists who perceive environmental stimuli during SSE participation tend to return to the destination if they have a favorable CDI and ADI. Notably, tourists would first develop a positive CDI and then develop a positive ADI.

6. Discussion

A conceptual framework grounded in the EPM was constructed to explain the relationship among the SES, CDI, ADI, and revisit intention. The framework was empirically tested using the Wuxi Marathon, and the study findings confirmed that the environmental stimuli of the Wuxi Marathon were positively associated with sport tourists' CDI and ADI, which in turn had a significant influence on their revisit intention about Wuxi the next year. CDI and ADI were affirmed as positive mediators of this relationship. Notably, this study revealed that the SES indirectly influenced revisit intention through the serial mediation of CDI and ADI.

6.1. Theoretical implications

This study made several contributions to sport and tourism literature. First, the results of the study indicated that the SES, as an antecedent, positively influenced sport tourists' CDI and ADI in the case of the Wuxi Marathon. This finding aligns with prior research conducted in the context of the Boston Marathon and triathlons in Germany [6,7,42], and responds to calls for more scholarly research to investigate what causes the formation of post-visit DI [18,25]. The positive associations between the SES and CDI and ADI are consistent with previous research [6,35]. However, previous studies typically utilized a unidimensional semantic scale that merely captured sport tourists' evaluation of specific environmental element [6,7,35,42]. The current study advances the field by employing a

Table 2
Descriptive statistics, reliability estimates and correlations for the study variables.

	SES	CDI	ADI	RI	M	S.D.
SES	(0.82)				4.05	1.83
CDI	0.38	(0.84)			4.89	1.49
ADI	0.47	0.27	(0.90)		5.81	1.21
RI	0.14	0.46	0.24	(0.95)	5.19	1.19

Note. N = 432; Values in the parentheses represent the square root of the average variance extracted; SES = SSE environmental stimuli; CDI = Cognitive destination image; ADI = Affective destination image; RI = Revisit intention; M = Mean; S.D. = Standard deviation. All correlations were significant ($p < 0.01$).

Table 3
Summary of Standardized path coefficients of the hypothesized paths.

	Paths	β	SE	Bootstrapping (95 % CI)		Results
				2.5 % Lower	2.5 % Upper	
	<i>Direct effect</i>					
H1a	SES → CDI	0.38 ^b	0.08	0.21	0.53	Support
H1b	SES → ADI	0.47 ^b	0.07	0.33	0.64	Support
H2a	CDI → RI	0.46 ^b	0.09	0.32	0.65	Support
H2b	ADI → RI	0.24 ^b	0.09	0.13	0.30	Support
	<i>Indirect effect</i>					
H3a	SES → CDI → RI	0.18 ^b	0.07	0.12	0.35	Support
H3b	SES → ADI → RI	0.12 ^a	0.05	0.08	0.23	Support
H4	SES → CDI → ADI → RI	0.03 ^a	0.01	0.02	0.08	Support

Note. N = 423. SES = SSE environmental stimuli; CDI = Cognitive destination image; ADI = Affective destination image; RI = Revisit intention. β = Standardized coefficient; SE = Standard error; CI = Confidence interval.

^a p < 0.05.

^b p < 0.01.

comprehensive measure of the SES. Empirical testing of this holistic measurement showed good results and validated the idea that sport tourists may develop a positive DI based on the physical environment they experienced, including the destinations’ natural, urban, and historical attractions. DI formation is also influenced by sport tourists’ perception of these elements’ relevance and compatibility with the events. The results supported the proposition that tourists’ destination experiences, along with their event experiences, improved their intentions to revisit a destination.

Second, the results empirically confirmed the conceptual framework developed from EPM, extending its application to studies of SSEs. Mehrabian and Russell’s EPM has been widely employed in studies on spectating sport events as a theoretical basis to understand the impact of the stadium environment on spectators’ event attendance. Although some scholars have noted that participants in sport events also observed the physical environment [6,43], the proposed mechanism of EPM had not been statistically examined. Moreover, previous research primarily focused on the relationship among spectators of sport events [10,26,34], with the perspective of players often ignored. Spectators and players react differently to the environmental stimuli they experience during events. This study addressed the research gap by applying the EPM to understand the psychological and behavioral responses of sport tourists to SES from the viewpoint of event players. Additionally, the current study validated previous measures of environmental stimuli specific of cycling within a more precisely defined sport event setting.

Third, this study adds new insights to the sport and tourism literature by identifying the serial mediation of CDI and ADI in the relationship between SES and revisit intention. The serial mediation model implied that the SES sport tourists perceived during the Wuxi Marathon first improved their CDI and then developed into an ADI of Wuxi, which finally triggered revisit intention. Although previous studies have measured the constructs of CDI and ADI, and examined them as important mediators explaining sport tourists’ responses to the physical environments of SSEs [19,23,24,27], there has been limited research analyzing their combined functionality. This study advances the literature by empirically validating the measures of CDI and ADI in an eastern context and assessing their impact on tourists’ revisit intentions. The serial mediation model illuminates the role that DI plays in the impact of SSEs’ physical environments on improving sport tourists’ intentions to revisit a destination.

6.2. Managerial implications

Our findings offer two main managerial implications for destination marketing and sport event planning. First, the case of Wuxi Marathon showed that Wuxi’s diverse environmental stimuli, including natural (e.g., Gonghuawan Wetland Park), urban (e.g., Wuxi Sport Center), and historic (e.g., Yuantouzhu Historic Town) attractions, increased sport tourists’ revisit intention. This finding presents an important implication for destination marketers who use SSEs as marketing tools for tourism development. That is, when planning an SSE, destination marketers should consider the compatibility of the environmental stimuli and the event. For instance, most participants of the Wuxi Marathon were leisure runners who participated for relaxation and entertainment. The diverse and scenic attractions along the route improved their appreciation and enjoyment. This experience increased players’ favorable CDI and evoked emotional resonance.

The current study found that sport tourists developed favorable CDI and ADI of Wuxi by participating in the Wuxi Marathon. These findings demonstrated that SSEs could increase sport tourists’ cognition and emotions about the host destination, which have implications for destinations that are less recognizable than cities like New York, Shanghai, and Tokyo. Specifically, the findings of this study suggested that, in marathon events, the condition of the race routes, the clarity of route markings, and the diversity and uniqueness of landscapes along the course significantly attract participants. These elements enhance participants’ impressions of the destination. Destination marketers targeting sport tourists should strategically consider these aspects of the route conditions, markings, and landscapes, as they contribute to the imagery of the host destination. Moreover, offering incentives such as half-price tickets to local tourist attractions for marathon finishers could further facilitate their favorable impressions and potentially extend their stays.

6.3. Limitations and avenues for future study

This study had some limitations that must be acknowledged. First, this study measured all variables using a cross-sectional approach, which cannot detect causal relationships. King et al. argued that sport tourists' DI gradually decayed after returning home, which weakened the power of DI to predict revisit intention [28]. To better understand the process, a longitudinal study must be conducted to examine how the CDI and ADI influence revisit intention over time. Second, the partial mediations of the CDI and ADI suggest the existence of other mediators within the relationship between the SES and revisit intention. Future research should explore other potential mediators, such as place attachment, to further our understanding of how the SES influence revisit intention. Finally, the conceptual framework was tested with a specific marathon event. The case study approach may limit the generalizability to other sport event settings. To augment the generalizability of the results and increase the framework's external validity, further research is needed to assess the framework using other types of sport events, such as multi-sport or multi-day events.

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Data availability statement

Data associated with the current study has not been deposited into a publicly available repository. The data were restored in the database of Shanghai University of Sport (offline). The university and the authors are responsible to participants' information confidential. The authors cannot share the data publicly without permission.

Institutional review board statement

The study was reviewed and approved by the Ethics Committee of Shanghai University of Sport, with the approval number: 102772023RT070.

Informed consent statement

All participants provided informed consent to participate in the study.

CRediT authorship contribution statement

Yanling Duan: Writing – review & editing, Validation, Supervision, Investigation, Conceptualization. **Ji Wu:** Writing – original draft, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Ji Wu reports financial support was provided by Shanghai Pujiang Program. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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