



Article

The Effects of a Virtual Reality Tourism Experience on Tourist's Cultural Dissemination Behavior

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Abstract: Virtual reality technology has been widely applied in the tourism industry, but the literature examining the relationship between the virtual tourism experience and cultural dissemination behavior is limited. This present study examines how a virtual reality tourism experience could stimulate tourists' cultural dissemination behavior intention. It does so by developing a moderated mediation model to explore how virtual reality tourism uses digital technology to improve tourists' experiential value, enhances their pride, and then affects their cultural dissemination behavior intentions. Results derived from a sample of 359 respondents show that VR experiential value can stimulate tourists' cultural dissemination behavior and that the link between VR experiential value and tourists' cultural dissemination behavior is mediated by pride. Furthermore, the cultural value of individual collectivism moderates the relationship between VR experiential value and pride. This study extends the theoretical understanding of virtual reality tourism from the emotional perspective and also has practical implications for VR design and destination marketing.

Keywords: VR experiential value; pride; cultural dissemination; individual collectivism; the emotion appraisal theory



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1. Introduction

The role of virtual reality in customer behavior has been frequently discussed, and the effects of virtual reality technologies have been investigated in various contexts in the hospitality and tourism industry, such as hotels [1], exhibitions [2], heritage sites [3], and museums [4]. The unprecedented COVID-19 situation poses extreme challenges for the travel and tourism industry. Traveling restrictions have jeopardized the tourism industry around the globe. For this reason, the digitalization of tourism is a viable solution for this situation. Modern virtual reality technology provides potential travelers with physical immersion and psychological presence through VR, augmented reality, and 360-degree video. By creating real-life situations and contexts, VR technologies can provide tourists with a virtual tour before the actual tour, making it a very powerful tool to stimulate tourists' traveling desire.

VR has been used in multiple areas in tourism including planning and management, marketing and information exchange, entertainment, education, accessibility, and heritage preservation [5]. Previous studies have fully discussed the benefits of VR experience, such as amplifying flow and increasing satisfaction toward the destination [6], alleviating stress and negative emotions [7] and improving well-being [8], increasing visitors' attachment to the real destination, and improving their visit intention [9–11]. As VR can trigger positive emotions and attitudes towards a destination, it has been used as a pre-experience destination marketing tool in various settings, such as theme parks, museums, cultural heritage centers, and art galleries [12,13]. There are also studies that examine the impact of VR on the on-site travel experience [14] and the post-travel phase [15]. As an innovative

way for the interactive provision of information and site enrichment, VR offers experiential value to tourists.

Experiential value has been identified as an important factor influencing tourists' decision-making process and behaviors in the tourism literature [16]. Experiential value can be divided into extrinsic values and intrinsic values [17]. Extrinsic value is derived from finishing a utilitarian errand or work, while intrinsic value results from the appreciation of the fun and playfulness of an experience for its own sake [17]. VR provides opportunities for users to escape from everyday life [5] by offering novel and aesthetic experiences. Through VR tourism, tourists may obtain extrinsic value such as completing the task of finding future travel destinations and enhancing intrinsic values through the entertainment and enjoyment derived from the aesthetic experience. Therefore, the experiential value of VR tourism can be a salient antecedent to tourists' perception of the destination and their future visiting behaviors.

As a medium of educational and cultural representation, museums are important carriers and methods of cultural dissemination as they forge identity development through collective memory-making [18]. The application of information and communication technology can visualize and virtualize the resources and collections of relics and intangible cultural heritage in a museum, enabling visitors to experience the culture virtually without an actual visit to the museum. The VR experiential value of museums may promote the cultural dissemination behavior. Therefore, with the increasing application of virtual technology in museums, it is of great significance for museums to explore how to make full use of the physical and virtual space to disseminate culture effectively and improve the depth and breadth of cultural dissemination. Thus, how virtual tours of museums can induce tourists' emotions and generate cultural dissemination intentions deserves further study.

Currently, the most widely used research model in VR experience studies is the Technology Acceptance Model (TAM) [19], which examines users' acceptance of new technology from the variables of perceived usefulness and perceived ease of use. Other important factors, such as the quality of the VR system, the information, and the type of VR stimuli, are also identified as antecedents of the VR tourism experience. The most commonly studied outcomes of VR experience include future visiting intentions [9], satisfaction with the destination, and loyalty to the destination [6,11,20]. Current literature on VR tourism has limitations in explaining the richness of the user's VR experiential value due to the lack of consideration of emotional factors. There is scant research on what constitutes VR experiential value and how the VR experiential value stimulates cultural dissemination behavior. No previous studies have used quantitative methodologies to examine the influence of VR experiences on cultural dissemination behavior.

Responding to this research gap, this study builds a moderated mediation model by introducing two constructs, pride and individual collectivism, to explore how virtual reality tourism experiences stimulate tourists' cultural dissemination behavior intentions. Since virtual tourism has the function of emotional stimulation, and pride is a positive emotion generated by a group's achievements and is also an important factor for pro-social behaviors, this study views it as a potential relationship quality construct and argues that it can explain the link between virtual reality tourism experiences and tourists' cultural dissemination behavior intentions. Additionally, the process through which virtual reality tourism experiences promote pride is moderated by the characteristics of the cultural value of tourists. Therefore, this study also considers the cultural value of tourists to explore the boundary conditions of virtual reality tourism experiences that trigger pride. Hence, taking into account the dynamic nature of the abovementioned constructs, we proposed our model (Figure 1), which aimed to explore how virtual reality tour experiential value promotes cultural dissemination behaviors. The current study attempts to extend the understanding of virtual reality tourism experiences from the emotional perspective and apply it to the promotion of cultural dissemination.

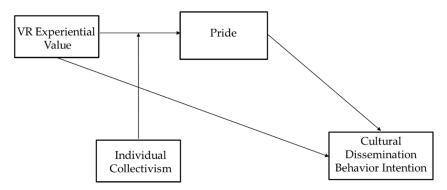


Figure 1. Research model for this study.

The goals of this study were (1) to empirically test whether VR experiential value in museums triggers tourists' cultural dissemination behavioral intentions, (2) to explore the mediating role of pride on the relationship between VR experiential value and cultural dissemination behavioral intentions, and (3) to investigate the moderating roles of cultural value on the relationship between VR experiential value and pride. By addressing these goals, this present study makes theoretical contributions in the field of virtual reality tourism literature and provides practical suggestions for museum organizers and VR designers to develop strategies and initiatives directed at improving tourists' experience value and promoting cultural dissemination behavior.

2. Literature Review and Hypotheses Development

2.1. VR Experiential Value

Experiential value is the customer's perception of a product or service. In an experience economy, a customer can gain experiential value through direct/indirect interactions with products and services [21]. Perceived experiential value is a direct antecedent of tourists' consumption decisions and behaviors. Experiential value can be divided into extrinsic values and intrinsic values. Extrinsic value is derived from finishing a utilitarian errand or work, while intrinsic value results from the appreciation of the fun and playfulness of an experience for its own sake [17]. Holbrook (1994) broadens the traditional extrinsicintrinsic conceptualization of experiential value by including an activity (active–reactive) dimension [22]. The active value derives from the collaboration between the consumer and the service provider, and the reactive value reflects the consumer's comprehension, appreciation, or response to a consumption object or experience [22,23]. Mathwick et al. (2001) proposed a typology of experiential value consisting of four dimensions: consumer return on investment, service excellence, playfulness, and aesthetic appeal [24]. Aesthetics reflects an intrinsic value generated by the reaction to salient visual elements, which can be perceived through the basic senses, or the customers' appreciation of the entertaining or dramatic aspects of the experience. Aesthetic appeal can be measured by visual appeal and entertainment. Playfulness is the intrinsic enjoyment that comes from engaging in activities that are absorbing, to the point of offering an escape from their everyday life. Playfulness can be measured by enjoyment and escapism [24].

Numerous cutting-edge technologies have been applied in the tourism industry, and digitalization has been changing the traditional nature of tourism in recent times. Experiential value in virtual tourism can be regarded as users' assessments of virtual tourism products and experience processes, which refers to the transaction or co-creation of experience between the service provider and the user based on the direct use or distant appreciation of virtual tourism products or services. Experiential value is perceived as the core component that determines the success or failure of the entire tourism experience [25].

Visual appeal is an important value as VR provides visitors with an aesthetic experience through visual elements, such as color, photographs, shapes, and font. Marasco et al. (2019) proved that visual appeal positively influences virtual tourists'

intention to visit the destination [15]. Besides, VR experiences can provide tourists with a psychological presence in a virtual environment. Users are actively involved in the simulated situation, which can evoke both emotional and physical reactions in the person. In a tourism context, previous studies have shown that cognitive factors (e.g., the environment, the atmosphere) had a strong influence on customers' affective responses, and these combined factors would eventually exert a significant impact on satisfaction and loyalty [26]. Research in virtual tourism experiences also finds that VR experience is a major determinant of the overall tourism experience satisfaction [27,28] and VR satisfaction affects the attitude and behavior intentions toward the destination [29]. Virtual tourism provides users with vivid and interactive activities that improve the ease of users' interpretations and enhance the comprehension of the visited sites. The intrinsic values of entertainment and enjoyment are realized from the aesthetic experience.

Virtual tourism experiences also help users to temporarily escape from reality, which relieves negative emotions and induces positive emotions. As a kind of hedonic experience, virtual tourism experiences can improve the psychological condition of residents and become an effective way to relieve stress. Cheng and Li (2020) found that virtual tourism experiences could effectively alleviate the stress and negative emotions of stay-at-home people and stimulate positive emotions during the COVID-19 epidemic [7]. Li, Song, and Guo (2021) found that virtual tourism experiences are effective in improving people's mental health and well-being [8].

In summary, we determined that visual appeal, entertainment, enjoyment, and escapism should be the key sub-dimensions of the VR tourism experiential value for this study.

2.2. VR Experiential Value and Cultural Dissemination Behavior Intention

Behavioral intention refers to the individual's positive or negative behavioral tendency or intention to the attitude target. It is usually used for predicting and understanding consumer behaviors. While studying the influence of service quality on consumer behavior, Zeithaml, Berry, and Parasuraman (1996) proposed a five-dimension behavioral-intentions battery, that is, loyalty, switch, pay more, external response, and internal response [30]. In tourism destination research literature, behavior intention is generally described as the intention to revisit and recommend [31,32].

Tourism is one of the cultural communication behaviors, and tourists are the carriers and communicators of culture. Tourists seek to satisfy their cultural needs while appreciating the local culture of a destination. Cultural dissemination behavior plays an important role in inheriting and promoting local cultures. On the basis of previous research and combined with the main research content of this paper, this study argues that cultural dissemination behavior intention refers to a subjective probability that people will perform certain behaviors to promote or disseminate the destination's culture, including recommendation intention, sharing intention, product-buying intention, revisit intention, and so on.

Researchers found that cognitive factors and emotional factors instigate behavior reactions, and cognitive and affective responses are highlighted as important constructs in influencing behaviors in individuals [33]. It has been shown by previous studies that VR tourism experiences can induce positive emotions and improve tourists' satisfaction and subjective well-being [7,8]. During the process of VR tourism, VR provides users with an aesthetic experience through visual elements and an immersive experience through vivid and interactive activities. The vividness and interactivity of VR have a positive influence on users' information searching and sharing behaviors [34]. Virtual tourism users transform virtual scenic spots into places that can interact with physical society through social behaviors such as taking photos, forwarding, commenting, and sharing. Previous studies have shown that virtual tourism experience values are important factors that influence visitors' intentions to participate in online communities and spread the electronic word of mouth [35]. After experiencing VR tourism, tourists will have cogni-

tive and emotional feelings toward the culture displayed in the virtual tour, which may instigate cultural dissemination behavior reactions. Therefore, this study proposes the following hypothesis:

H1. *VR* experiential value has a positive effect on cultural dissemination behavior intentions.

2.3. The Mediating Role of Pride

The emotion appraisal theory regards emotions as an adaptive response to an individual's external environment [36]. The external stimulus environment is an important source of information that stimulates individual emotional responses. In VR tourism, the virtual environment provided by VR technology can stimulate tourists' emotions. The emotions gained from travel experiences can be divided into positive emotions and negative emotions. Pride is defined as one's self-appraisal of being socially valued or responsible for accomplishing a socially valued outcome [37] and is regarded as a positive emotion [38].

Pride as a construct has been widely studied in both psychology and management disciplines. As a positive emotional factor, pride has been considered as an extremely important emotion for motivating social behavior [39]. Research has demonstrated that tourism experiences can trigger pride in various contexts. Hong et al. (2018) investigated the effects of natural-based tourism experiences on visitors' environmental attitudes and behaviors and found that collective pride aroused by the natural experience can promote environmentally responsible behavior [40]. Liu and Teng (2021) examined the driving mechanism of pride in tourists' civilized behavioral intention in the development of red tourism resources [41]. Loureiro (2019) confirmed that tourists are more likely to feel pride when they perceive the visiting experience as being authentic and genuine in a museum [42]. However, the concept of pride has been rarely examined in the context of virtual tourism.

Collective pride is a positive emotion generated by the group's achievements or being stronger than other groups [43]. Collective pride comes from the successful behavior of the group. The key to collective pride is the inspiration of identity. According to social identity theory [44], individuals will internalize cognitive evaluations related to group membership into self-recognition. When individuals have a high sense of belonging to the group they belong to, they will have strong emotion and value attachment, and expand their emotions from the individual level to the group level. When individuals are fully aware of the positive accomplishments of the group, they tend to enhance their group-based self-esteem among group members [45]. The positive meta-stereotypes and perceptions held by observers external to the group enhance social identification. Through virtual tourism, tourists can appreciate the cultural, historical, sporting, and artistic achievements that reflect the collective achievements of the country or nation. Tourists may experience a sense of collective pride after they have a positive attitude towards collective achievements. Therefore, the following hypothesis is proposed:

H2. *VR* experiential value has a positive effect on pride.

Pride feelings also function to reinforce and motivate the socially valued behaviors that help maintain a positive self-concept and others' respect [39,46]. Positive emotion can enhance cognitive flexibility and promote participation in activities and sharing experiences [47]. As a positive emotion of self-consciousness, pride is closely related to pro-social behavior such as cooperation, sharing, help, etc., and can promote the pro-social behavior of individuals with high group loyalty. When visitors are satisfied with the traveling experience, they are more willing to spread the word to others and convey the pleasure and knowledge gained from the experience so that they can achieve approval from the group or community dedicated to the culture and even gain a sense of belonging to such a group or community [42]. Thus, pride may be related to improving tourist ethics and promoting cultural communication behaviors. Pride has the effect of promoting individual moral development. When virtual tourism inspires tourists' identity and pride, this sense of pride may promote their moral development and make them feel moral responsibility [41]; that

is, they feel that it is their responsibility to protect the culture and let more people know about their culture. As a result, in the process of virtual tourism, tourists' pride in the national culture will further promote their cultural dissemination behavior. Therefore, the following hypothesis is proposed:

H3. Pride has a positive effect on cultural dissemination behavior intention.

Positive emotions are often accompanied by pleasant feelings, which have an expanding effect on cognition. It promotes visitors' active connection with the environment and positive sharing behaviors [48]. The empirical research of emotional experiences has shown that positive emotions (such as happiness, excitement) have a positive effect on revisit intentions and recommendations [49]. The behavior of cultural dissemination may be realized through the positive emotion of pride. Based on the emotion appraisal theory's "cognition—emotion—behavior" analysis path, it is possible that the value of virtual travel experiences affects visitors' pride, and the positive response of pride directly drives cultural dissemination behavior. Therefore, the following hypothesis is proposed:

H4. Pride has a mediating effect on VR experiential value and cultural dissemination behavior intention.

2.4. Moderating Effect of Individual Collectivism Cultural Value

According to the emotion appraisal theory, emotions are produced by the individual's evaluation of external environmental stimuli, and this evaluation process is affected by the situation and the individual's psychology. Due to individual differences in beliefs, attitudes, and personality characteristics, people's cognitive evaluations of external environmental stimuli are highly subjective, which directly leads to large differences in their emotional experiences. Emotional responses can be different even to the same stimulus environment [50]. When tourists are evaluating the emotions trigged by a virtual environment in VR tourism, they may evaluate the impact of the virtual environment stimuli and also regulate their response to stimuli. Cultural value may play an important role in moderating emotions.

Individualism and collectivism are two major cultural forms identified by scholars [51]. Based on Hofstede's cultural dimensions, researchers have identified the role of cultural value in deciding consumers' behavior, especially cultural comparisons at the national level. In the field of tourism studies, especially in the internet environment, researchers have investigated the role of individualism/collectivism in online destination brand perception among different cultural groups [52]. The construct of individualism/collectivism has recently been studied as a moderator variable. For example, Cho et al. (2013) identified the role of individualistic and collectivistic cultures on young consumers' pro-environmental behavior [53]. Han et al. (2017) identified the moderating effect of culture (individualism vs. collectivism) on loyalty formation for wellness spas [54].

In cross-cultural studies, the Chinese are always regarded as highly collectivistic. However, researchers also found that individuals in the same national (collectivistic—individualistic) culture may define their identity differently [55]. Some individuals hold more collectivistic values, while others hold more individualistic ones. Cultural differences at the national level have effects on tourists' behavior. There are also possibilities that the same effect may exist among tourists holding collectivistic values and individualistic values at a personal level. In fact, researchers have studied collectivism at the individual level and have found that individual collectivism is related to commitment and has a positive impact on organizational citizenship behavior and turnover intention [56]. Kitirattarkarn et al. (2019) also found that collectivism at the individual level was related to their behaviors on social networking sites [57]. In this study, we discuss the cultural value of collectivism at the personal level and explore its influence on VR experiences and pride.

People holding collectivistic values are more likely to perceive more value congruence and evaluate the group or organization more positively and are more likely to relate the group or organization to a positive self-concept. This will result in positive feelings such

as pride, satisfaction, and emotional attachment [56]. Since people with high collectivistic values are more likely to feel collective pride, the influence of external stimuli on pride may be lower. On the contrary, the influence of experiential value on pride may be stronger for people holding individualistic values. We thus propose that:

H5. Individual collectivism cultural value moderates the relationship between virtual experience value and pride, such that the relationship is stronger when tourists have low individual collectivism.

3. Materials and Methods

3.1. Participants and Procedure

This study aimed to examine the relations between virtual tourism experience and cultural dissemination behavior. We took Dunhuang culture as the object of empirical research. As a witness of the ancient Silk Road, Dunhuang embodies the cultural essence of different periods and different nationalities. The Dunhuang Mogao Grottoes, a splendid art treasure house in ancient Chinese culture and civilization, witnessed and recorded the dialogue and exchanges between different civilizations that took place on the ancient Silk Road. Considering the importance of Dunhuang culture and its status in the world's cultural exchange, we chose Dunhuang to study cultural dissemination behavior.

"Digital Dunhuang" (https://www.e-dunhuang.com/, accessed on 15 January 2022) is a virtual project for the protection of Dunhuang culture, which includes the application of virtual reality, augmented reality, and interactive reality. This project conducts comprehensive digital collection, processing, and storage of Dunhuang Grottoes and related cultural relics, and builds a digital resource library of the Grottoes' cultural relics. High-definition digital images and panoramic roaming of the 30 fine caves of Dunhuang Grottoes are freely shared with the world through the Internet. Visitors from all over the world can experience the Dunhuang Grottoes. Through the "Digital Dunhuang" project, visitors can be placed in a virtual space of 30 caves and a 4430 M² area of murals, spanning 10 dynasties. The "Digital Dunhuang" project breaks the constraints of time and space and meets people's needs for travel, appreciation, and research. Users can participate in interactive activities such as dubbing, subsidizing culture protection, and are encouraged to invite friends to participate in these activities. The innovative interactive methods not only improve the user's sense of participation but are also beneficial for disseminating Dunhuang culture via interpersonal communication media.

Participants who experienced "Digital Dunhuang" VR services were recruited to complete the survey. The authors posted recruitment requests on Baidu forums and Wechat to recruit participants. A VR device was a prerequisite for the experience, so the authors asked questions in order to choose respondents who actually experienced VR technology in Mogao Grottoes (e.g., Have you got a WebVR-API-capable desktop browser or a mobile device and a VR headset? Did you use VR service during the Mogao Grottoes tour?). A present was sent to each respondent after finishing the survey. A total of 800 invitations were sent, and 420 responses were received. After excluding responses that were too short (less than 150 s) or pattern responses (e.g., 12,345, 6666), 359 questionnaires were used for the final analysis, with an effective rate of 85.4%.

3.2. Questionnaire Design

The questionnaire consisted of five parts. To ensure the content validity of the constructs, all the constructs were adopted from previous studies. Part 1 deals with the measurement of experiential value. The experiential value measurement scale was adapted from He et al. (2018) [58] and Zheng (2021) [59] and consists of four dimensions: Visual appeal, entertainment, enjoyment, and escapism. Items were modified according to the context of virtual tourism. Part 2 deals with the measurement of pride adopted from Lenka (2015) [60]. Part 3 deals with the cultural value measurement of Individualism/Collectivism [54,56,61]. Part 4 deals with the measurement of cultural dissemination behavior intentions, which were also adopted from previous studies [62,63]. All instru-

ments were measured on 5-point Likert scales, where 1 represented strongly disagree and 5 represented strongly agree. Part 5 presents respondents' demographic information. Table 1 shows the measurement scales.

Table 1. The measurement scales.

Construct	Items	Reference
Experiential Value	The visual design of the application is appealing. The information provided by the application is adequate. This virtual tour conveys information by using multiple methods such as sounds, images, 3D visualizations, videos, animations, or expressions. The size of the 3D virtual objects is adequate. Having such virtual tour experience gets me away from the vexations and pressures of real life. Having such virtual tour experience makes me feel like I am in another world. I get so involved when I have the virtual tour experience that I forget everything else. I think the virtual tour is very entertaining. This virtual tour answers my personal questions about the culture. Having such virtual tour experience is a good way to relax myself. I really enjoy this virtual tour experience. The virtual tour experience is exciting. I am indulged in the activities.	[58,59]
Pride	I am proud of Chinese scientific and technological achievements. I am proud of Chinese achievements in sport. I am proud of Chinese achievements in arts. I am proud of Chinese history.	[60]
Cultural Value	Individual rewards are not as important as group welfare. Group success is more important than individual success. Being accepted as a member of a group is more important than having autonomy and independence. Being accepted as a member of a group is more important than being independent. Being loyal to a group is more important than individual gain. Managers should encourage group loyalty even if individual goals suffer.	[54,56,61]
Cultural Dissemination Behavior Intention	I will share and repost information about Dunhuang on social media. I will post status and express views and opinions about Dunhuang on social media. I will actively participate in the interactive activities of Dunhuang on social media. I will recommend Dunhuang to others. I am willing to pay more to buy souvenirs of Dunhuang. I will volunteer my time to activities that help disseminate Dunhuang culture. I will support disseminating Dunhuang culture as much as I could.	[62,63]

The items were first developed and written in English, and afterward, translated into Chinese, back-translated, and then retranslated to ensure comparability of data between the English and Chinese versions of the questionnaire. A total of 359 fully completed questionnaires were collected, validated, and included in the analysis. Table 2 presents the demographic profile of respondents. There were slightly more females (51.5%) than males (48.5%). More than half of the participants (68.7%) were below the age of 40. For education, most participants held a college degree (47.9%), and 22% received an undergraduate degree. From the demographic profile of respondents, we can see that the VR users are young and well-educated and are skillful at using digital technology.

Table 2. The demographic profile of respondents.

Variables	Category	Numbers	Frequency
Con ton	male	174	48.5%
Gender	female	185	51.5%
	18–29	140	38.9%
	30–39	107	29.8%
Age	40–49	62	17.3%
Ü	50-59	45	12.5%
	>=60	5	1.4%
	High school	11	3.1%
	College/vocational training	84	23.4%
Education	University	172	47.9%
	Master's	79	22.0%
	PhD	13	3.6%
	Student/unemployed	125	34.8%
Occupation	Non-specialized occupation	101	28.1%
Occupation	Specialized occupation	118	32.9%
	Others	15	4.2%

4. Results

4.1. Confirmatory Factor Analysis

We performed confirmatory factor analyses to examine the reliability and validity of the measures. As shown in Table 3, the factor loadings of all items were greater than 0.6, ranging from 0.610 to 0.918. Cronbach's alphas of each construct all exceeded the cutoff of 0.70. The composite reliability (CR) estimates of the variables were all above the suggested criterion of 0.70 [64], ranging from 0.863 to 0.907. In addition, the average variance extracted (AVE) scores of all the factors exceeded the commonly agreed-upon criterion of 0.50 [64]. The above results suggest that the four latent variables in this study have sufficient combined reliability and convergent validity.

Table 3. Results of composite reliability and convergent validity.

Vari	ables	Items	Loading	T	CR	AVE	Cronbach'α
		Vis1	0.830	42.709	0.902	0.697	0.902
	Visual appeal	Vis2	0.859	50.086			
	visuai appeai	Vis3	0.816	39.702			
		Vis4	0.835	43.853			
		Esc1	0.856	46.858	0.863	0.678	0.853
E	Escapism	Esc2	0.873	52.976			
Experiential		Esc3	0.735	26.705			
Value		Ent1	0.860	54.232	0.892	0.734	0.880
	Entertainment	Ent2	0.918	79.895			
		Ent3	0.788	35.925			
		Enj1	0.897	71.865	0.885	0.721	0.880
	Enjoyment	Enj2	0.887	65.339			
		Enj3	0.757	31.286			
		Pri1	0.812	38.106	0.907	0.710	0.907
	. 1	Pri2	0.835	43.059			
Pı	ride	Pri3	0.871	51.859			
			0.852	46.800			
		Val1	0.829	41.658	0.904	0.612	0.893
G 1:	Cultural Value		0.828	41.460			
Cultur			0.766	31.465			
		Val4	0.789	33.968			

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Variables	Items	Loading	T	CR	AVE	Cronbach'α
	Val5	0.848	45.992			
	Val6	0.610	17.085			
	Int1	0.823	43.047	0.934	0.671	0.930
	Int2	0.839	47.198			
C. le I.D	Int3	0.877	61.628			
Cultural Dissemination Behavior Intention	Int4	0.873	59.645			
	Int5	0.715	26.064			
	Int6	0.841	47.781			
	Int7	0.751	29.831			

4.2. Descriptive Statistics

Table 4 shows the results of the descriptive statistics, including means, standard deviations, and correlations among the variables. The results show that VR experiential value was positively correlated with pride ($\gamma=0.546$, p<0.01), cultural value ($\gamma=0.606$, p<0.01), and cultural dissemination behavior ($\gamma=0.701$, p<0.01). Pride was positively correlated with cultural value ($\gamma=0.616$, p<0.01) and cultural dissemination behavior ($\gamma=0.521$, p<0.01). In addition, cultural value was positively correlated with cultural dissemination behavior ($\gamma=0.722$, p<0.01). These significant correlations provided preliminary support for the subsequent regression analysis.

Table 4. Means, standard deviations, and correlations of the variables.

	1	2	3	4
1.VR				
experiential	0.841 ^a			
value				
2.Pride	0.546 **	0.843 ^a		
3.Cultural value	0.606 **	0.616 **	0.782 a	
4.Cultural				
dissemination	0.701 **	0.521 **	0.722 **	0.819 a
behavior	0.701	0.321	0.722	0.019
intention				
Mean	3.957	4.396	4.030	3.864
SD	0.697	0.664	0.717	0.753

Note: N = 359. ^a Square root of AVE. ** p < 0.01.

4.3. Hypothesis Testing

This study follows the Edwards and Lambert [65] analytical framework of analyzing moderated mediation effects. Six regression models were constructed, in which M1-M3 assigned pride as the outcome variable, and M4-M6 assigned cultural communication behavior intention as the outcome variable.

First, we examined the main effects among the variables on the basis of controlling for demographic variables (gender, age, education, and occupation). As shown in Table 5, VR experiential value has a significant impact on cultural dissemination behavior (M4, β = 0.593, p < 0.001) and pride (M1, β = 0.701, p < 0.001). Pride also has a significant impact on cultural dissemination behavior (M5, β = 0.450, p < 0.001). Thus, H1, H2, and H3 were supported.

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Table 5	Results	\cap t	hierarchical	regression	modeling
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	Pride			Cultural Dissemination Behavior		
Variables	M1	M2	М3	M4	M5	M6
Independent Variable						
VR experiential value	0.701 ***		0.593 ***	0.546 ***	0.273 ***	0.267 ***
Mediator Variable						
Pride		0.521 ***	0.197 ***		0.450 ***	
Moderator Variable						
Cultural value						0.421 ***
Interaction term						
VR experiential value						-0.161 ***
× Cultural value						-0.161
\mathbb{R}^2	0.491	0.271	0.518	0.298		
ΔR^2	0.491	0.271	0.027	0.298		
F	344.277 ***	132.727 ***	191.390 ***	151.463 ***	132.128 ***	97.097 ***
ΔF	344.277 ***	132.727 ***	20.092 ***	151.463 ***	79.491 ***	15.943 ***

Note: N = 359. *** p < 0.001.

Second, we examined the mediated effects of VR experiential value and cultural dissemination behavior. As Table 5 shows, VR experiential value was positively related to pride (β = 0.701, p < 0.001) and pride was positively associated with cultural dissemination behavior (β = 0.450, p < 0.001). Meanwhile, the indirect effect was significant (β = 0.116, p < 0.001), and the 95% confidence interval (CI) did not include zero (0.046, 0.189). The results prove that pride mediates the link between VR experiential value and cultural dissemination behavior, which supports Hypothesis 4.

Third, we examined the moderating effect of cultural value on the relationship between VR experiential value and pride. The results showed that the interaction between VR experiential value and pride significantly positively affected cultural dissemination behavior ($\beta = -0.161$, p < 0.001). The indirect effect was found to be statically significant ($\beta = -0.033$, 95% CI [-0.058, -0.009]). To better present the moderating effect of cultural value, we conducted a simple slope analysis and plotted the pattern of the moderating effect at one standard deviation above and below the mean (see Figure 2). The results showed that the indirect effect of cultural value was stronger among tourists with low individual collectivism ($\beta = 0.081$, 95% CI [0.031, 0.130]) than among tourists with high individual collectivism ($\beta = 0.033$, 95% CI [0.008, 0.066]). Thus, Hypothesis 5 was supported.

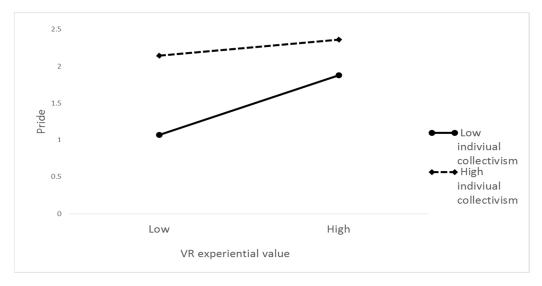


Figure 2. Moderating effect.

5. Discussion and Implication

To explore whether VR experiential value can stimulate tourists' cultural dissemination behavior intentions, this study proposed a moderated mediation model by introducing two constructs, pride and individual collectivism. We tested this model using a large data sample, exploring VR experiential value as the independent variable, pride as the mediating mechanism, individual collectivism as the moderator, and tourists' cultural dissemination behavior intentions as the outcome. A number of findings are notable.

First, VR experiential value can stimulate tourists' cultural dissemination behavior intention. VR experiences provide visitors with a visual feast and an opportunity to temporarily escape from reality. In addition, the interactive and vivid characteristics of the virtual environment cause users to blur the boundaries between the virtual environment and physical reality, resulting in a high perception of authenticity, entertainment, and enjoyment. Previous literature on VR tourism has mainly concentrated on users' acceptance of technology [1,19], the antecedents of VR tourism satisfaction, and the relation between satisfaction and users' visitation intentions [27–29]. Some studies have proven that virtual tourism increases the willingness of real visitation [29,59], but Deng et al. (2019) found that virtual reality may decrease the interest in actual reality [66]. Due to the limitations of time, cost, COVID-19, traveling documents, etc., VR experiences may not necessarily lead to real visits. When visitors are informed about cultures presented in VR and are satisfied with the traveling experience, they are more willing to spread the word to others and convey the pleasure and knowledge gained from the experience. VR experiential value will lead to cultural dissemination behavior, which has been neglected in previous literature.

Second, this study confirmed that the positive emotion of pride mediated the relation between VR tourism and cultural dissemination behavior. Our findings showed that VR tourism provides tourists with opportunities to appreciate the cultural, historical, sporting, and artistic achievements that reflect the collective achievements of the nation, which in turn triggers a sense of collective pride in tourists. When tourists are proud of collective achievements, they are more likely to share and disseminate the culture. The verification of emotional mechanism provides a new theoretical perspective for the study of virtual tourism by taking tourists' pride into consideration, that is, to understand the value and effectiveness of virtual tourism experiences from the perspective of tourists' emotional experience, which enriches the academic research on the impact of virtual tourism. Verification of the emotional mechanism can better explain the behaviors of the tourists and can also help VR designers to realize the importance of stimulating tourists' positive emotions.

Third, this study also uniquely identified individual collectivism as the moderator of the relationship between VR experiential value and pride. Based on Hofstede's [51] cultural dimensions, previous literature has confirmed the influence of national cultural value on tourists' behaviors in cross-cultural studies [53,54,56]. The constructs of individual-ism/collectivism have recently been studied as moderator variables; however, the cultural value of collectivism at the personal level has rarely been studied. This study introduces the variable individual collectivism to explore the boundary of the effect of VR experiential value on pride. Our findings showed that the effect of VR experiential value on pride is stronger for people with low individual collectivism. Since people with high collectivistic values are more likely to feel collective pride, the influence of an external stimulus such as VR experiential value on pride is lower. On the contrary, the influence of experiential value on pride is more perceptible for people with low individual collectivism. Thus, it is advisable to strengthen the education of collectivist values to improve the individual collectivism value.

This study contributes to the theoretical understanding of VR tourism and its influence. First, this study advances the VR tourism literature by revealing the underlying mechanism of the effects of VR experiential value on cultural dissemination behavioral intentions. It also deepens the understanding of cultural dissemination behavior by identifying a new antecedent. Second, the verification of emotional mechanism provides a new theoretical

perspective for the study of virtual tourism by taking tourists' pride into consideration, which has rarely been examined in the context of virtual tourism. Third, this study is the first to empirically investigate the role of individual collectivism in VR tourism. Additionally, in view of the fact that there is insufficient research on the moderating role of individual collectivism, the present study addressed this gap by exploring the moderating effect of individual collectivism on the link between VR experiential value and tourist pride, offering a powerful supplement to the existing research.

The findings of this study also provide several practical implications.

First, virtual reality is an innovative means of destination demonstration and is valuable for tourism marketing. This study confirmed the significance of the effect of VR experiences on cultural dissemination behavior. Museums are important carriers of local culture and collective memories. Therefore, museum practitioners and VR developers should make full use of the local culture to create VR products that can enhance tourists' experiential value. Aesthetic appeal is important, so the design should be developed such that the visual appeal of VR is well suited or in harmony with the tourism destination and its cultural characteristics. The findings also suggest that virtual content producers should focus on increasing interactive and immersive activities to engage tourists in an authentic simulated environment so that users gain a desirable experience.

Second, the design of cultural elements should be strengthened, and representative cultural symbols such as art, architecture, etiquette, festivals, food, and customs of the destination should be displayed in VR products to create a cultural atmosphere. Pride is proven to mediate the relation between VR experiences and cultural dissemination, so VR developers should emphasize the content with interactive and immersive characteristics by using attractive factors such as storytelling to stimulate visitors' interest and deepen their cultural understanding. VR products should enhance the cultural connotations and cultural added value to ensure that tourists can obtain a full understanding of the authenticity and vitality of the displayed culture. In the process of virtual experiences, tourists can learn the origin, development, and evolution history of the culture, which will arouse their emotional resonance and enhance their sense of pride.

However, this study has some limitations. First, because the data were collected only by respondents visiting "Digital Dunhuang", it is difficult to generalize the results of this study in various VR settings. The functions and designs of VR are different among different museums. Our sample cannot represent all VR tourists. Future studies could offer more comprehensive data by collecting data from different museums. Second, the present study focused on the influence of VR experiences on cultural dissemination behaviors, while it did not fully take into account factors related to visitors' motivations and knowledge about the culture. Future studies of the effects of VR could integrate more factors of tourists' personal preferences.

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