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Comparing Sensory Experience Creation Process of Visitors with Hearing Impairment and General Visitors in Hong Kong Wetland Park

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Abstract: Universal accessibility and barrier-free experience of public spaces such as parks are at the frontier of social sustainability and disability research. Such accessible and quality public spaces are characterized by enjoyable sensory stimuli and facilitating factors determining the process of sensory experience creation. Among visitors with sensory impairment such as different ranges of hearing loss, an understanding and a comparison of this process with that of general visitors is largely absent. This paper presents a comparative investigation of the sensory experience creation process between visitors with hearing impairment (HI) and that of general visitors in the Hong Kong Wetland Park. This study incorporates a series of field visits to the Wetland Park with a sample of 104 HI participants and their self-reported, questionnaire-based survey, in parallel with 279 general visitor surveys. Through an inter-group statistical comparison between HI sub-groups of severe hearing loss and mild hearing loss and general visitors who reported no hearing difficulty, the findings suggest three variables with significant difference, namely, experienced tactile sense, interactions with other visitors, and feelings of attachment to the Wetland Park. HI experience-based recommendations are categorized into park features and environment and programming and experience enhancement.

Keywords: behavioral geography; hearing difficulty; multi-sensory experience; public parks; sensory experience creation; sensory impairment

Citation: Chan, C.S.; Shek, K.F.; Agapito, D. Comparing Sensory Experience Creation Process of Visitors with Hearing Impairment and General Visitors in Hong Kong Wetland Park. *Sustainability* **2022**, *14*, 7676. https://doi.org/10.3390/su14137676

Academic Editors: Tsung Hung Lee, Fen-Hauh Jan and Pei-Shiang Chang

Received: 11 May 2022
Accepted: 22 June 2022
Published: 23 June 2022

1. Introduction

According to the United Nations Convention on the Rights of Persons with Disabilities, persons with disabilities should have equal access to participation in cultural life, recreation, leisure, and sport (Article 30) [1]. Enjoyable visitor experiences should be regarded as an important component of universal leisure accessibility, although the complexity of the needs of disability and the characteristics of destination environments is still not thoroughly researched, especially for people with sensory impairment [2,3]. People with hearing impairment (HI) account for about 2% of the global population with different types and varying degrees of disability [4]. Research has shown that several constraints limit this minority group from participating in physical activities and participation [5]. Similar conclusions have been drawn in other studies describing barriers this group faces in domestic and outbound travel experiences [6,7].

Senses are largely relevant to how urban green spaces such as public parks may provide cultural ecosystem services to local populations [8,9]. Some studies have examined the barriers and constraints of HI groups in rural and natural landscapes (e.g., [2,10,11]) and urban environments (e.g., [12,13]). Issues of accessibility are also factors determining the effectiveness of public management and governance [11]. However, there is a dearth of

knowledge regarding differences in sensory experience between HI visitors and general visitors, especially in outdoor environments such as natural landscapes and public parks. The process of sensory experience creation of those with HI is not well understood [14]. This is true even in cities with well-developed, publicly accessible park systems and facilities that attempt to provide universal design and services for all [5]. As a public park aiming to serve all visitors with a barrier-free environment, the Hong Kong Wetland Park ("the Wetland Park") makes a good case study for the current research.

In Hong Kong, there are 47,900 persons with a reported degree of hearing loss, which constitutes around 0.6% of the entire citizen population [15]. However, this number only accounts for those using a hearing aid and does not represent the complete population of people living with varying degrees of hearing loss or difficulty. Except for pre-registered group visitations, many public facilities such as parks do not record HI admission due to the difficulty in distinguishing this group of visitors from general visitors. Apart from outbound travel experience [16], their local experience in local attractions is also under-researched. In particular, there is a lack of empirical comparison between the experience of this group and general visitors in shared public environments such as parks, since existing research about visitor experience of people with disabilities has mainly focused on those with physical mobility issues [17–19].

To bridge the abovementioned knowledge gaps in HI accessibility and sensory experience, this study aims to understand the varied factors and conditions determining how the people with HI perceive, react to, and interpret their surrounding landscape and environment through a comparative analysis between HI and general visitors, using the case of Hong Kong Wetland Park. This paper aims to answer two key research questions: (1) How do HI and general visitors report their respective processes of sensory experience creation based on sensory stimuli and internal and external factors of the Wetland Park? (2) Are there any differences in the sensory experience creation process factors between HI and general visitors? The expected key findings of these two questions allow more understanding of the HI visitors in different kinds of public spaces, although this study undertakes a park with wetland landscape and features as the case.

In this study, the theoretical framework established by Agapito et al., (2013) [14] was adapted to discern the external and internal factors affecting the sensory experience creation process. These factors incorporate sensory stimuli, external and environmental features, and human and service-related attributes that collectively function in the specific settings of Wetland Park.

2. Literature Review

Whereas the aim of addressing various types of visitors with disability and impairment is to create accessible places with universal design [20], the needs of people with sensory impairment have not been well researched [17], except in a few studies on outdoor environments and nature-based destinations (e.g., [21–24]). Specifically, people with HI are likely ignored due to their less "visible" disability [19,25]. However, they might face different perceived barriers, such as information barriers, communication barriers, attitudinal barriers, and context-specific barriers. First, HI visitors encounter information barriers that are related to the difficulty of access to certain channels such as websites with audio messages as well as inaccurate and reliable information about destinations [10,11,26].

Second, communication obstacles have also been noted as crucial barriers faced by HI visitors. Most studies in Table 1 highlighted communication barriers as a primary constraint due to the lack of training received by staff at the destination or attraction [2,13,26]. Specifically, staff in different destinations and environments lacked the knowledge, empathy, and skills (e.g., sign language) needed to cater to those with hearing disabilities [26]. Third, attitudinal barriers are less frequently addressed despite some studies showing this type of barrier to be commonly related to staff behavior and attitude towards groups with disabilities [27]. HI visitors complained that staff did not treat them as general visitors [2], which impeded and worsened their travel experience [27].

Table 1. Critical review of studies about barriers faced by visitors with hearing impairment in different destinations and places.

Study	Study Site	Subjects	Key Findings: Barriers Faced by Visitors with Hearing Impairment
Freeman & Selmi (2009) [26]	Visitor accommodation in France and Canada	3 out of 25 visitors with hearing impairment in France; and 5 out of 24 visitors with hearing impairment in Canada	• Unavailability of some communication formats that were important for visitors with hearing impairment, such as telephone with TTY or TDD numbers (telephone numbers that enable those with oral or aural disabilities to use telephones) • Inaccessibility of information about accommodation for visitors with hearing impairment • More facilities and services for visitors with movement disabilities in accommodation, but less for visitors with visual or hearing impairment
Sanmargaraja & Wee (2015) [11]	National Parks in Malaysia	Respondents from NGOs, government, academics, and architectural fields involved in policy-making, designing, and construction process of accessible tourism	• Hard to search for website information accessible to people with hearing impairment • No proper guidelines on tourist facilities and accommodation facilities • Insufficient information about accessibility of accommodation] • Lack of sign language interpretation service for visitors with hearing impairment • Self-service ticket machines at the public transport station had limited visual signage for visitors with hearing impairment
Bashiti & Rahim (2016) [12]	Shopping malls in Malaysia	Interviewees with hearing impairment (sample size not mentioned)	• Lack of signage for visitors with hearing impairment • Lack of clear visual signage and indicators (visual communication devices) inside some of the elevators and other enclosed spaces • Unclear signage in buildings (e.g., contrast color and good lighting not used) • No lighting of emergency alarm in elevators and unclear emergency exit signage • Unsupportive staff at the information counter for visitors with disabilities
Ho & Peng (2017) [6]	NA	30 backpackers with hearing impairment and severe hearing loss in Taiwan	• Inaccessible travel option of group tours for visitors with hearing impairment • Difficulty in understanding tour guiding; lack of sign language or other effective communication methods
Kaganek et al. (2017) [28]	NA	55 out of 450 visitors with hearing impairment	• Financial barriers • Organizational barriers • Equipment barriers

Table 1. *Cont.*

Study	Study Site	Subjects	Key Findings: Barriers Faced by Visitors with Hearing Impairment
Lwoga & Mapunda (2017) [10]	The Village Museum site in Tanzania	Interviewees from the service and existing facilities that support visitors with special needs	• Lack of interpreters with professional skills in communicating with visitors with hearing impairment • Lack of special interpretation services targeting visitors with hearing impairment • Inaccessible product offering of some artistic and handcraft groups in some sites for visitors with hearing impairment • Lack of leaflets, booklets, and guidebooks for visitors with hearing impairment
McKercher & Darcy (2018) [3]	NA	NA	• No information about flight and train arrival for visitors with hearing impairment • Differences in sign language between countries impose travel barriers for visitors with hearing impairment to different destinations • Lack of assistive technologies and alternative communication devices for visitors with hearing impairment
Chikuta, du Plessis & Saayman (2019) [2]	National parks worldwide	20 out of 210 visitors with hearing impairment	• Inaccessible reception services such as unavailability of staff who know sign language, no hearing loop, unknowledgeable about disability needs, lack of interaction with visitors with disabilities, and staff's discrimination towards visitors with disabilities • Information barriers such as inaccessible information at catering venues • Communication barriers such as inaccurate formats of text messaging for room services or other accommodation services
Lim (2020) [27]	NA	2 out of 7 participants had an experience of discrimination in tourist activities and had experiences of more than one overseas trip and three domestic trips	• Lack of clear information and guidance for facilities, such as boarding, getting off, and precautions at amusement parks for visitors with hearing impairment • Attitudinal barriers such as discrimination by staff and other visitors
Chiscano & Jimenez-Zarco (2021) [13]	The Cosmocaixa Science Museum, Barcelona, Spain	2 out of 32 visitors with hearing impairment	• Unsupportive staff, such as managers who lacked understanding of the needs of visitors with disabilities and difficulty in communication with staff in the museum • Lack of information in an accessible and accurate format • Difficulty in finding a sign language interpreter

Furthermore, structural barriers, which are related to destination environments and physical design, constrained the experiences of both visitors with varied disabilities [28,29]. Some HI-related obstacles identified include lack of signage and information about flight and train arrival [3,12] and sound-reliant facilities [11]. Consequently, without an accompanying person or assistive device such as a hearing loop, those with HI may face significant, multi-dimensional challenges in travel. These structural barriers are also closely related to sensory barriers, which would affect those with HI [30,31]. Therefore, a thorough understanding of how HI visitors react to the sensory stimuli of an outdoor environment such as a recreation facility or a public park is valuable in bridging this knowledge gap.

Among previous studies examining visitor experience of people with physical or sensory disabilities, HI visitors have only received minimal attention. This group often constituted a small portion of the overall sample in these studies; for example, eight HI respondents out of 49 participants [26], twenty out of 210 participants [2], and two out of 32 participants [13]. Considering there is only a slight difference in frequency of travel between general and HI visitors [32], this minority group is underrepresented in travel and tourism research. In this regard, it is questionable whether existing research involving HI participants can adequately address the complexity of barriers faced by this group. Doing so would require the use of HI visitors as a distinctive sample and distinguishing their sensory experience from that of general visitors.

3. Methodology

3.1. Theoretical Framework and Instrument

This study modifies the theoretical framework of Agapito et al. [14], which depicts the external and internal factors characterizing a destination's sensory resources and determining the perception of the overall visitor experience. This framework has been adapted to the contextual and sensory-based conditions in Wetland Park. This framework explains how an individual visitor perceives the stimuli in a specific environment. In the case of Wetland Park, it incorporates the relationship between the park's external environmental attributes and sensory features and the internal reactions of a visitor to the sensory environment. The research framework in Figure 1 encompasses both variables of the external environment—design factors; tangible features and intangible services, staff performance, information and services, and social interactions with others; and internal factors—place attachment, onsite satisfaction, behavioral intention to revisit and recommend to others, long-term memorization, long-term satisfaction, and loyalty. These constructs were measured with a 5-point Likert scale statement for rating. Socio-demographic, physical, and psychological characteristics, self-reported degree of impairment of the five senses, and situational variables were also assessed. One important adjustment in the questionnaire was the use of single-item to assess constructs, as pilot communications indicated some respondents had difficulty understanding complex textual questions (Table 2).

Table 2. Structure of questions to HI participants.

SEEP Questions	Sensory Stimulus (Sense/Sensation)/Item Codes	Sources
What is/are the most impressive scene(s) or thing(s) that you have seen?	Visual/optical (sight) (SEEP 1)	Chen et al., 2009; Dickinson & Hobbs, 2017; Green & Brock, 2002; Gretzel & Fesenmaier, 2010; Zaltman, 2003 [8,17,33–35]
What is/are the most impressive color (s) to you?	Mental imagery by color domination (sight) (SEEP 1)	
What is/are the most impressive type(s) of sounds to you (if you have a hearing aid device)?	Acoustic (hearing) (SEEP 2)	
What is/are the most impressive smell(s) to you?	Olfactory (smell) (SEEP 3)	
What is/are the most impressive type(s) of food or flavors (if eaten something) you have had during this trip?	Gustatory (taste) (SEEP 4)	
What is/are the most impressive texture(s) to you?	Tactile (touch) (SEEP 5)	

Table 2. *Cont.*

SEEP Questions	Sensory Stimulus (Sense/Sensation)/Item Codes	Sources
External factors		Modified from Agapito et al., 2013; Daruwalla & Darcy, 2005; Goss et al., 2015 [14,36,37]
Park design (e.g., spatial layout)	Design (E1)	
Physical environment and facilities	Tangible features and intangible services (E2)	
Park services		
Technical support by staff	Staff performance, information, and services (E3)	
Interactive guidance and services by staff		
Interactions with other visitors	Social interactions (E4)	
Interactions with local people and communities		
Internal factors		
Feeling of attachment	Place attachment (R1)	
Onsite satisfaction	Onsite satisfaction (R2)	
Intention to revisit	Behavioral intention (R3)	
Intention to recommend to others		
Positive memories	Long-term memorization (R4)	
Positive experience	Long-term satisfaction (R5)	
Becoming a regular visitor and a fan	Loyalty (R6)	

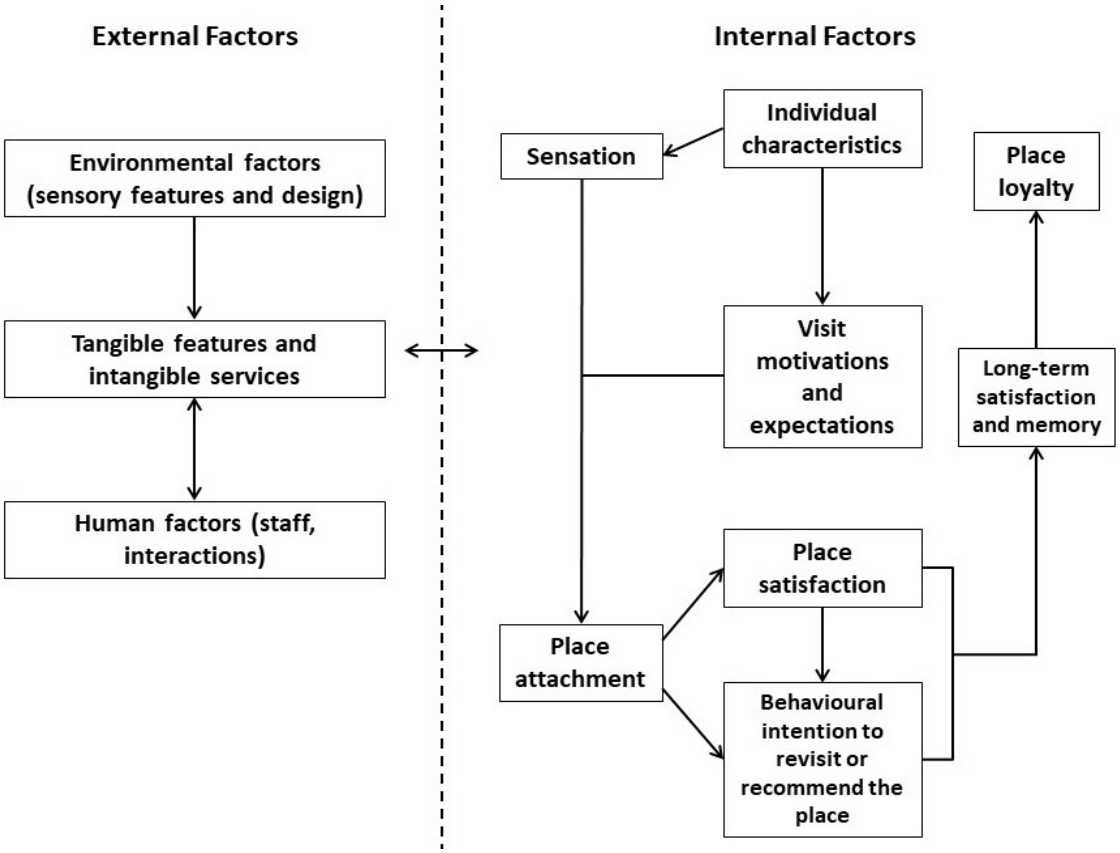

Figure 1. Research framework (Modified from Agapito et al. [14] (p. 66)).

The sensory experience was measured by the Sensory Experience Elicitation Protocol (SEEP), an instrument that extracts self-reported sensory information [8,33,34]. SEEP is composed of a series of structured questions facilitating narrative descriptions of sensory qualities [17,35]. In this study, the SEEP framework was transformed into a set of predefined, 7-point Likert scale items of sensory stimulus—sight, hearing, smell, taste, and touch—identified in the Wetland Park. Lastly, an open-ended question was included to solicit recommendations from HI participants on possible Park improvements in terms of barrier removal and accessibility.

3.2. Research Design, Data Collection, and Data Analysis

Onsite investigation and self-reported primary data collection were adopted in this research, as the traditional approach of landscape assessment through indoor or remote experimental set-up was not considered adequate to simulate the park environment [38,39]. Voluntary sampling was deemed appropriate due to the unavailability of a random sampling frame and the difficulty of sampling the local HI population [36,40,41]. Participants of this study are registered HI members of The Hong Kong Society for the Deaf (HKSOD) recruited through the organization. These participants were offered free admission, transport expenses, and cash allowance on their field visit to the Wetland Park [36,40,41]. All field visits took place between May and November 2021 with 11 to 31 adult participants in each visit, making up a total of 104 participants. All HI participants were given clear guidance and information in the data collection process to ensure accurate responses and communication. During each visit, one research coordinator acted as the visiting moderator with the help of a team of trained assistants and a sign language interpreter, who assisted neutrally in communication with HI participants. A parallel survey with an identical questionnaire was distributed on each field visit to randomly sampled general visitors in the park. There was a total of 282 general visitor surveys collected, of which 279 were treated as valid, i.e., with a response rate of 98.9%.

Quantitative statistical analysis was performed to handle and compare the two sources of data from both HI and general respondents. The data were computed and processed using IBM SPSS Statistics (SPSS) and modeling by IBM SPSS Amos. Statistical applications, including descriptive analysis, inter-group ANOVA comparison, Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM) were used to establish a model of the internal-external relationship of factors in the sensation process [42]. A thematic content analysis was conducted to extract aspects of HI participants' recommendations for park improvement.

4. Results

The socio-demographic and visitation profile of this study shows a total sample size of 383, including 27.2% HI responses and 72.8% general visitor responses. The HI respondents have either severe (62.5%, both ears > 71 dB HL) or mild (37.5%, at least one ear < 70 dB HL) levels of hearing loss. The majority of respondents had visited the park before (81.9%).

4.1. External Factors

Comparing sensory stimuli, park features and attributes, and human aspects between different groups, visual sense (scene and color) is the most prominent sense (m = 5.08–5.55) in the park for both HI and general visitors. In contrast, the sense of taste (m = 3.30–3.87) is the least attributed to the park (Table 3). The sensory stimuli show a ranking from visual, hearing, tactile, and smell to taste attributes, respectively. Except for the sense of taste, the severe HI group tends to possess the strongest experienced sensory stimuli in visual, smell, and tactile attributes. Having aid devices, HI respondents surprisingly have a similar hearing sense to general people. Since most HI respondents use a hearing aid, they have similar levels of hearing as general visitors. This circumstance also reflects the real situation and classification of the HI population in society [15].

Table 3. Comparison between sensory stimuli of visitor groups.

Attributes (Overall Mean/Rank)	Overall Hearing	Valid N	Mean [Rank]
Scene(s) or object(s) (5.37/1)	General	274	5.39 [2]
	Mild	38	5.08 [3]
	Severe	62	5.45 [1]
Color(s) (5.31/2)	General	273	5.25 [3]
	Mild	39	5.33 [2]
	Severe	64	5.55 [1]
Sound(s) (having a hearing aid device) (4.70/3)	General	267	4.71 [2]
	Mild	32	4.50 [3]
	Severe	48	4.79 [1]
Smell(s) (4.42/5)	General	253	4.32 [3]
	Mild	32	4.56 [2]
	Severe	60	4.75 [1]
Taste(s) (3.77/6)	General	208	3.87 [1]
	Mild	20	3.30 [3]
	Severe	33	3.42 [2]
Texture(s) (4.47/4)	General	226	4.25 [3]
	Mild	34	4.74 [2]
	Severe	56	5.21 [1]

Remarks: General: General visitors without reported hearing difficulty; Mild: HI visitors with mild to moderate-severe hearing difficulty; and Severe: HI visitors with severe to profound hearing difficulty.

The inter-group comparative result of one-way ANOVA in Table 4 shows a significant difference in the tactile sense ($F(2,313) = 8.195$; $p < 0.01$). Tukey's HSD test reveals that only the mean of tactile sense is significantly different between general visitors and severe-HI visitors ($p = 0.032$, 95% C.I. = [0.05, 0.144]), and not in visual, acoustic, olfactory, and gustatory stimuli. The results of multiple regression analysis, controlling demographic and visitation variables, further confirm that the higher the level of hearing impairment, the greater the importance is for the tactile sense ($B = 0.354$, $p < 0.05$) without multicollinearity detected. This shows that the overall hearing level of HI visitors is a significant predictor of the experienced tactile stimulus.

Table 4. ANOVA results of sensory stimuli (SEEP 1–5) comparison.

Sensory Stimuli		Sum of Squares	df	Mean Square	F	Sig.
Scene(s) or object(s)	Between Groups	3.705	2	1.852	0.994	0.371
	Within Groups	691.111	371	1.863		
	Total	694.816	373			
Color(s)	Between Groups	4.624	2	2.312	1.195	0.304
	Within Groups	721.588	373	1.935		
	Total	726.213	375			
Sound(s) (having a hearing aid device)	Between Groups	1.716	2	0.858	0.385	0.681
	Within Groups	766.711	344	2.229		
	Total	768.427	346			
Smell(s)	Between Groups	9.510	2	4.755	1.890	0.153
	Within Groups	860.548	342	2.516		
	Total	870.058	344			
Taste(s)	Between Groups	10.252	2	5.126	1.636	0.197
	Within Groups	808.491	258	3.134		
	Total	818.743	260			
Texture(s)	Between Groups	44.127	2	22.064	8.195	0.000 **
	Within Groups	842.670	313	2.692		
	Total	886.797	315			

** $p < 0.05$.

Park environmental factors indicate the extent of positive experience in park features and intangible attributes that affect the visitor experience. Park design, physical environment, and facilities and park services are the most positive factors for HI visitors. One-way ANOVA result in Table 5 shows a significant difference in the item interactions with other visitors ($F(2,285) = 4.852$ $p < 0.01$), but not other features of the park environment. Then, controlling for demographic and visitation variables, multiple regression further confirms the positive relationship between the level of hearing impairment and "interactions with other visitors" ($B = 0.389$, $p < 0.05$) without multicollinearity detected.

Table 5. ANOVA results of non-sensory environmental (E1–E4) comparison.

External Factors (Overall Mean)		Sum of Squares	df	Mean Square	F	Sig.
Park design (5.66)	Between Groups	0.327	2	0.163	0.103	0.902
	Within Groups	592.964	375	1.581		
	Total	593.291	377			
Physical environment and facilities (5.49)	Between Groups	1.831	2	0.915	0.511	0.600
	Within Groups	672.903	376	1.790		
	Total	674.734	378			
Park services (5.34)	Between Groups	0.788	2	0.394	0.205	0.815
	Within Groups	672.737	350	1.922		
	Total	673.524	352			
Technical support by staff (5.12)	Between Groups	2.495	2	1.248	0.554	0.575
	Within Groups	675.986	300	2.253		
	Total	678.482	302			
Interactive guiding and services by staff (5.15)	Between Groups	7.528	2	3.764	1.487	0.228
	Within Groups	774.323	306	2.530		
	Total	781.851	308			
Interactions with other visitors (4.47)	Between Groups	27.886	2	13.943	4.852	0.008 **
	Within Groups	813.264	283	2.874		
	Total	841.150	285			
Interactions with local people and communities (4.06)	Between Groups	11.202	2	5.601	1.558	0.213
	Within Groups	851.981	237	3.595		
	Total	863.183	239			

** $p < 0.05$.

4.2. Internal Factors

Regarding internal factors, intention to revisit, onsite satisfaction, and intention to recommend to others are the most positive attributes for HI visitors. The inter-group comparative result of one-way ANOVA in Table 6 shows a significant difference in the feeling of attachment ($F(2,367) = 5.429$; $p < 0.01$). The results of multiple regression analysis, controlling for demographic and visitation variables, further confirm that the higher the level of hearing impairment, the stronger the feeling of attachment to the park ($B = 0.419$, $p < 0.05$) without multicollinearity detected.

Table 6. ANOVA results of internal factor (R1-R6) comparison.

Internal Factors (Overall Mean)		Sum of Squares	df	Mean Square	F	Sig.
Feeling of attachment (4.56)	Between Groups	29.465	2	14.732	5.429	0.005 **
	Within Groups	995.843	367	2.713		
	Total	1025.308	369			
Onsite satisfaction (5.31)	Between Groups	4.142	2	2.071	0.942	0.391
	Within Groups	833.407	379	2.199		
	Total	837.550	381			

Table 6. *Cont.*

Internal Factors (Overall Mean)		Sum of Squares	df	Mean Square	F	Sig.
Intention to revisit (5.37)	Between Groups	1.950	2	0.975	0.392	0.676
	Within Groups	914.972	368	2.486		
	Total	916.922	370			
Intention to recommend to others (5.27)	Between Groups	0.342	2	0.171	0.064	0.938
	Within Groups	990.920	371	2.671		
	Total	991.262	373			
Positive memories (5.09)	Between Groups	2.470	2	1.235	0.484	0.617
	Within Groups	931.571	365	2.552		
	Total	934.041	367			
Positive experience (4.84)	Between Groups	1.344	2	0.672	0.253	0.776
	Within Groups	939.233	354	2.653		
	Total	940.577	356			
Becoming regular visitor and a fan (4.51)	Between Groups	4.872	2	2.436	0.852	0.427
	Within Groups	1040.845	364	2.859		
	Total	1045.717	366			

** $p < 0.05$.

4.3. Comparison between Sensory Experiences of HI and General Visitors

Before proceeding to CFA, the reliability of the constructs was computed in SPSS to examine the internal consistency of items in each dimension. The composite reliability values of each construct range from 0.838 to 0.926. As they all have a value higher than 0.70, it can be said that each construct was statistically reliable [43,44]. The modified measurement model featured five constructs measuring 14 observed variables with a factor loading ranging from 0.644 to 0.932, exceeding the minimum threshold of 0.60 where constructs have extracted sufficient variance from the items [45]. For data convergent and discriminant validity, the values of average variance extracted (AVE) range from 0.692 to 0.819, all exceeding a minimum acceptable value of 0.50 for the latent variables with MSV scores less than AVE [44]. Five outliers were removed based on the assessment of the Mahalanobis distance, thus, a total of 99 valid cases were included in this analysis.

In examining the relationship among the constructs of sensory, external, and internal factors, a two-step approach by Anderson and Gerbing (1988) [46] was used. Firstly, CFA using the Maximum-likelihood (ML) estimation was performed on the measurement model. Items factor loading greater than 0.6 were retained for analysis. A series of indices of fit were evaluated including absolute fit measures (CMIN = 195.149, CMIN/DF = 2.913, RMSEA = 0.074 and GFI = 0.928), incremental fit measures (CFI = 0.964, RFI = 0.927, IFI = 0.964 and NFI = 0.946), and parsimony fit measures (PNFI = 0.707; PCFI = 0.726). These results were generally considered to be a good fit [47] (Table 7). Due to relatively small sample sizes affecting the effectiveness of the model [48], the CFA and resultant SEM outcome combine the analysis of HI and general visitors to verify group difference in regression path coefficients, rather than separately revealing the models of each group.

Following the model fit of CFA, non-visual sensory stimuli are excluded from the construct, leaving behind two visual sensory elements—scene and color. After conducting CFA to confirm the suitability of the measurement model (Table 8), SEM was then proceeded to test the proposed relationship among the constructs. The independent constructs include non-sensory environmental factors (environment), human and service factors (service), and visual sense (sensory), while dependent constructs include satisfactory experience and memories (satisfaction) and behavioral intention (loyalty). The resultant values of the coefficients are summarized in Figure 2.

Table 7. Model fit summary of CFA.

Model	X^2	X^2/df	GFI	CFI	IFI	NFI	RFI	TLI	RMSEA
CFA	195.149	2.913	0.928	0.964	0.964	0.946	0.927	0.951	0.074
Acceptable	-	>3	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	<0.08
	CR	AVE	MSV	MaxR(H)	Loyalty	Service	Env.	Sensory exp	Satis.
Loyalty	0.900	0.819	0.667	0.909	0.905				
Service	0.868	0.692	0.125	0.913	0.227	0.832			
Env.	0.887	0.797	0.350	0.890	0.387	0.354	0.893		
Sensory exp.	0.839	0.722	0.350	0.841	0.344	0.184	0.592	0.850	
Satis.	0.925	0.713	0.667	0.933	0.817	0.339	0.385	0.401	0.844

Table 8. CFA result.

	Constructs and Items	Alpha	Standardized Regression Weight
	Park visible features and environment		
A1	Park design	0.886	0.909
A2	Physical environment and facilities		0.876
	Human and service factors		
A4	Technical support by staff	0.857	0.908
A5	Interactive guidance and services by staff		0.914
A6	Interactions with other visitors		0.644
	Visual sense		
B1	Impressive scene(s) or thing(s)	0.838	0.855
B2	Impressive color (s)		0.798
	Satisfactory experience and memories		
D2	Onsite satisfaction	0.926	0.842
D3	Positive memories		0.915
D4	Feeling of attachment		0.807
D5	Positive experience		0.793
D6	Becoming regular visitor and a fan		0.860
	Behavioral intention		
E1	Intention to revisit	0.900	0.877
E2	Intention to recommend to others		0.932
	Acceptance value	0.70	0.60

Regression paths coefficients of the SEM of each group are presented in Table 9. The results demonstrate relationships between pairs of constructs at a significant level of 0.05 for both HI and general groups, including (1) human and service factors, and satisfactory experience and memories, (2) visual sensory experience, and satisfactory experience and memories, and (3) satisfactory experience and memories, and behavioral intention. The relationship between park features and environment and behavioral intention is also significant for general visitors.

Consequently, satisfactory experience and memories is positively affected by (1) human and service factors (standardized coefficient: 0.220/0.388; *t*-value: 3.461/2.632), and (2) (visual) sensory experience (standardized coefficient: 0.230/0.391; *t*-value: 2.814/2.673). Satisfactory experience and memories positively affect behavioral intention (standardized coefficient: 0.760/0.908; *t*-value: 11.714/9.845). For general visitors only, park features and environment positively affect behavioral intention (standardized coefficient: 0.213; *t*-value: 3.109).

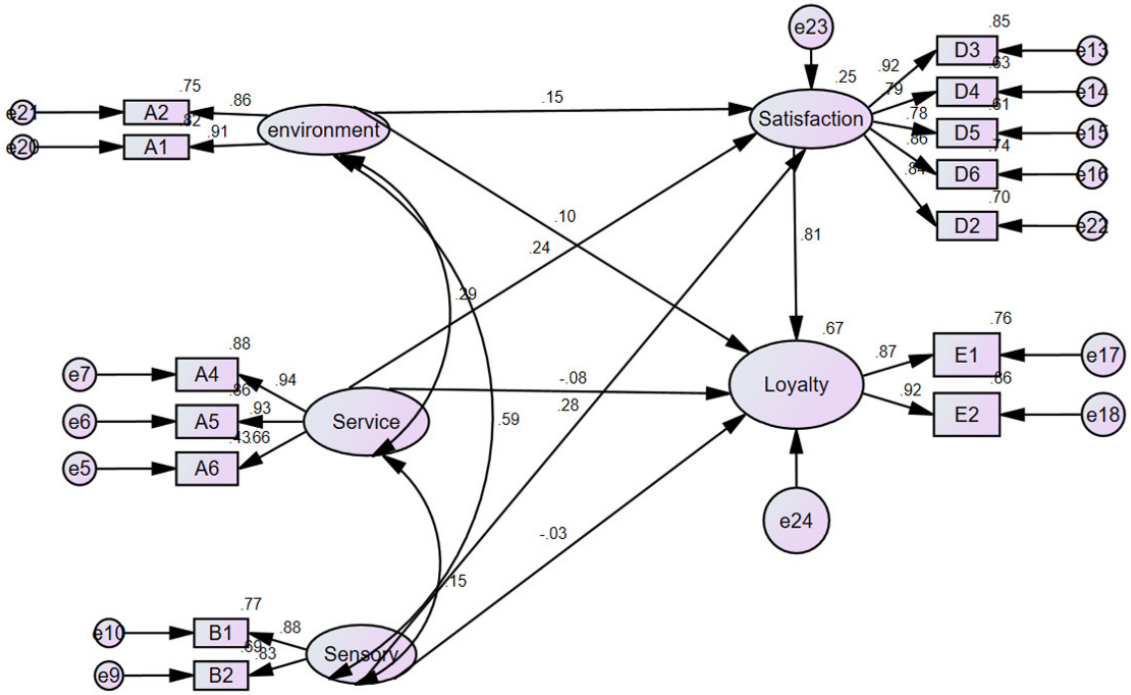

Figure 2. SEM results of the internal-external constructs of sensory-based conditions in the Wetland Park.

Table 9. Direct effects of constructs and Chi-square group difference test in the SEM of HI and general visitors.

General Visitors			
Regression Paths Coefficient	**Standard Path**	**Critical Ratio (*t*-Value)**	***p*-Value**
Environment → Satisfaction	0.226	2.708	N.S.
Service → Satisfaction	0.220	3.461	***
(Visual) sensory experience → Satisfaction	0.230	2.814	*
Environment → Loyalty	0.213	3.109	**
Service → Loyalty	−0.090	−1.766	N.S.
Sensory experience → Loyalty	−0.103	−1.565	N.S.
Satisfaction → Loyalty	0.760	11.714	***
HI Visitors			
Regression Paths Coefficient	**Standard Path**	**Critical Ratio (*t*-Value)**	***p*-Value**
Environment → Satisfaction	−0.210	−1.295	N.S.
Service → Satisfaction	0.388	2.632	*
(Visual) sensory experience → Satisfaction	0.391	2.673	**
Environment → Loyalty	−0.025	−0.272	N.S.
Service → Loyalty	−0.062	−0.739	N.S.
(Visual) sensory experience → Loyalty	0.095	1.097	N.S.
Satisfaction → Loyalty	0.908	9.845	**
Regression Paths Coefficient		**Group Difference (df = 1)**	
Environment → Satisfaction		$X^2 = 5.432$, $p \leq 0.020$	
Service → Satisfaction		$X^2 = 0.676$, $p \leq 0.411$	
(Visual) sensory experience → Satisfaction		$X^2 = 0.976$, $p \leq 0.323$	
Environment → Loyalty		$X^2 = 3.171$, $p \leq 0.075$	
Service → Loyalty		$X^2 = 0.076$, $p \leq 0.782$	
(Visual) sensory experience → Loyalty		$X^2 = 2.886$, $p \leq 0.089$	
Satisfaction → Loyalty		$X^2 = 5.968$, $p \leq 0.015$ *	

*** $p \leq 0.001$; ** $p \leq 0.01$ * $p \leq 0.05$; N.S. not significant.

Lastly, multigroup moderation was performed in Amos by verifying the Chi-square difference between HI and general visitors [49]. The results only reveal one effective regression path coefficient ($X^2 = 5.968$, $p \leq 0.015$), indicating a significant difference between HI and general visitors. This relationship shows that satisfactory experience and memories (satisfaction) positively influence behavioral intention (loyalty) to Wetland Park, which is stronger among HI participants than general visitors surveyed in the park. Nonetheless, the other constructs do not show inter-group difference, although separately, each sampled group has certain significant relationships among some constructs.

5. Discussion

5.1. Differences in Sensory Experience Creation Process between HI and General Visitors

Across all variables under the constructs of sensory stimuli, non-sensory environmental factors, and internal factors, only three variables show a significant difference between HI (sub-groups of severe hearing loss and mild hearing difficulty) and general visitors (without reported hearing difficulty). First, tactile sense is found to be prominent and stronger among HI visitors with severe and mild hearing difficulty than general visitors. Such observation concurs with some earlier studies, for example, where general visitors received the least attention from tactile images online across the five basic senses (e.g., [50]), and that non-visual senses did determine the richness of the overall visitor experience and impression of the destination (e.g., [51,52]). Although the current study suggests that a combination of sensory stimuli with visual and acoustic senses is the most pertinent to the overall sensory experience (Table 3), only tactile stimuli in Wetland Park show an inter-group difference.

Second, both HI sub-groups with mild and severe hearing difficulty possess significantly stronger interactions with other visitors than general visitors. In many attractions and public spaces, it was observed that HI visitors tended to be reliant on social interactions for the enhancement of their experience [36,53].

Third, both HI sub-groups with mild and severe hearing difficulty possess significantly stronger feelings of attachment to the Wetland Park after their visit. Similar to some studies on general visitors [54,55], HI visitors tend to express their satisfaction with the site of visit and develop some positive behavioral intention to revisit or recommend the place to others.

5.2. Barriers to Park Experiences

Experiential enhancement is related to physical and environmental features and services. From the perspective of barriers to travel and experience, these attributes are regarded as interpersonal and structural barriers for visitors with disabilities [56]. These two forms of barriers also affect the functional capacity of access to the site of the visit [16,21,57,58], which include internal and external physical access at site level [59], sensory access with the provision of assistive devices for users with disabilities [57], and communication access for information and interactions with different people [7,11,60]. These barriers were found in the travel experience of people with visual impairment [61] but seemed to be less relevant for HI visitors in the current study.

HI participants still apparently rely on visual stimuli to enhance their park experience in the current study. However, the finding that HI visitors have a stronger tactile sense than general visitors diverges from previous research findings (e.g., [62–64]). Furthermore, non-visual senses are not incorporated in the HI-reported model of the sensation formation process, even tactile sense is significantly stronger among this group of visitors.

6. Conclusions

This paper presents comparative research on the sensory experience creation process between HI visitors and general visitors in Hong Kong Wetland Park. The findings suggest three variables with significant differences: the experienced tactile sense, interactions with other visitors, and the feeling of attachment to the park.

6.1. Theoretical Contributions

Disability is no longer a purely medical consideration but a changing paradigm of a socially constructed and communicative concept [16,36,65–67]. This study reveals that HI visitors demonstrate similar sensations as general visitors with no reported disabilities. This phenomenon may be motivated by behavioral intention to merge themselves into society or due to the usage of a hearing aid. Although HI participants reported mild to severe hearing difficulty, they still show the possibility of expressing a sense of hearing and making acoustic stimuli a positive component in their sensory experience in Wetland Park (Table 3). In fact, their sense of hearing is not statistically significantly different from that of general visitors (Table 4). Interestingly, tactile sense and its associated features in the park largely contribute to the sensory experience of HI visitors, serving as clear evidence of sensory compensation or substitution [34] or a tactic use of non-visual stimuli in enhancing sensory experience in outdoor environments [51]. Concisely, these research findings may alter visitor outcomes in experiencing landscape quality and rectify the knowledge gap in this area of study in Hong Kong and beyond.

6.2. Managerial Implications

HI populations are not a homogeneous group but diverse segments of visitors with a range of language and communication requirements [29,31,37] and diverse cultural factors affecting visitor perception and behavior [68]. Nevertheless, little academic contribution exists to understand the needs of HI visitors from the perspective of destination design and accessible tourism [60,69].

The current position of the Hong Kong Wetland Park is to "enable all visitors, including those with special needs to visit the Park at ease . . . and provide a barrier-free environment to visitors" [70]. Special devices and aid such as induction loop systems are provided to visitors with visual and hearing impairment. In the current study, it is important to enhance the sensory experience as well as human interactions and service received by HI visitors. Similar observations were found in previous studies, such as Goss et al. [53], which highlighted the design factor in fostering social interactions among visitors with a range of hearing abilities and difficulties. It is important to have ambassadors and guides who may provide more interactive and stimulating guiding service and friendly communications with the HI visitors so that they are more likely to develop a stronger sense of place and in-depth experience of the positive attributes of the park. These attributes are connected to resultant satisfaction with the park, and, ultimately, long-term behavioral intention and loyalty to the park.

6.3. Limitation and Future Direction of Research

Inter-group statistical comparison in this study carries a sampling bias due to a difference in sample size between HI participants and general visitors. The resultant models may not be generalizable across populations of visitors with disabilities. The use of single-aspect items to detect the HI internal experience also limited the explanation of the framework. Nevertheless, the results recognize a need to better understand an under-researched minority group—HI visitors– in the domains of accessible tourism, barrier removal, and sensory experience. Another constraint is caused by the inability to provide an in-depth investigation into the underlying spatial-temporal pattern of HI sensory experience. Therefore, future studies may examine the spatial pattern of sensory stimuli experienced by visitor groups with different types of impairment [71].

Author Contributions: Conceptualization, C.S.C. and D.A.; methodology, C.S.C. and D.A.; validation, C.S.C.; formal analysis, C.S.C. and K.F.S.; investigation, C.S.C. and K.F.S.; resources, C.S.C.; data curation, C.S.C.; writing—original draft preparation, C.S.C.; writing—review and editing, C.S.C. and D.A.; visualization, K.F.S.; supervision, C.S.C.; project administration, C.S.C.; funding acquisition, C.S.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research project (Project Number: 14607919) is funded by the General Research Fund (GRF) administered by the Research Grants Council (RGC) of the Government of the Hong Kong Special Administrative Region. The researcher Dora Agapito is partially financed by Portuguese Funds provided by FCT—Foundation for Science and Technology (Portugal) through project UIDB/04020/2020.

Institutional Review Board Statement: The study was approved by the the Survey and Behavioural Research Ethics Committee (SBREC) of the The Chinese University of Hong Kong (CUHK) (SBRE-18-064, 24 October 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Acknowledgments: The collaboration and arrangements by the Hong Kong Society for the Deaf (HKSOD) and the Hong Kong Wetland Park branch of Agriculture, Fisheries and Conservation Department (AFCD), The Government of Hong Kong SAR are acknowledged.

Conflicts of Interest: The authors declare no conflict of interest.

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