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Creating positive memory in staged experiences through sensory tools

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ABSTRACT

This research investigates the link between the degree of sensory stimulation and positive memory in staged experiences. First, a field study on how two museums used sensory tools in their experience design was conducted. The findings showed that senses played an important role in experience evaluation. However, the actual effect was often felt on a subconscious level, making it difficult for visitors to distinguish between the importance of different senses. Taking this into account, the second study was conducted with a holistic view of the senses. Data were collected through an online survey distributed to a consumer panel asking the participants to relate to a specific experience. The findings showed a strong relationship between the sensory dimension and positive memory, in part mediated by cognitive and affective dimensions. These findings and the chosen methodology add to the growing knowledge on sensory experience design. From a practical perspective, this study offers important implications for experience providers.

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sensory profile

Introduction

An experience is defined as an event or visit of a memorable character (Pine & Gilmore, 1998, 1999). Some occur more or less spontaneously, while others are staged and may require the experienter to pay a fee. Although experiences are defined in slightly different ways in different contexts, there is broad consensus that personal and subjective experiences form the core of this definition (Agapito et al., 2014; Tung & Ritchie, 2011). Personal reflections on experiences help shape the individual's self-understanding and reality construction (Carù & Cova, 2003; Sims, 2009). In many ways, experience production is the art of directing a mental journey that strengthens customers' self-understanding and influences them in a personal way, and experience providers have various tools at their disposal to enhance the personal experience (Pine & Gilmore, 1999; Sundbo, 2009).

Pine and Gilmore (1998) suggest that 'the more senses an experience engages, the more effective and memorable it can be' (1998, p. 104), simultaneously pointing both to senses as a tool and to memorability as an important identification of success or satisfaction (see also Pine & Gilmore, 1999). Indeed, Pine and Gilmore (1998) claimed that the goal of the experience provider is to stage memorability; in other words, it is the memory that is the real experience. Acknowledging that memories represent a means to access prior experiences and to share them with, and

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perhaps recommend them to, friends and family (Cao et al., 2019), providers should take positive memory into account when developing experiences.

Despite comprehensive interest in experience research, the scope of empirical studies on the relationship between sensory tools and experience evaluation is limited and underdeveloped, particularly in field settings (Agapito et al., 2014; Antón et al., 2018; Radder & Han, 2015). Several studies have called for more research on how sensory dimensions affect the evaluation of an experience (e.g. Zatori et al., 2018), and others have pointed to the need for in-depth studies on the meaning of a sensory experience (e.g. Hung et al., 2016).

In this article, we focus on how the sensory element of a staged experience influences tourists' positive memory of the experience. We are interested in understanding both how different sensory aspects are emphasized by visitors and the coherence between the multisensory aspects and visitor evaluation. We investigate this through two studies. First, we explore how visitors value the different sensory stimuli used in two staged experiences. Second, we analyse the relationship between sensory stimuli and the positive memory of an experience.

This research contributes to the literature in several ways. First, building on the dawning discourse of sensory museums (Bishop, 2017; Hutchison, 2017; Smith, 2020; Wang, 2020), study 1 gives insight into how sensory tools are used in two types of museums and the challenges that occur when sensory tools are used in non-enclosed settings. Second, combining insight developed by researchers such as Brakus et al. (2009) in a marketing context and Agapito and colleagues (2017, 2014, 2013) within tourism, study 2 measures the relationship between what can be classified as subjective and mental experiences and the customers' retrospective assessment of named and specified real-life paid experience. Contrasting most previous research, our study targets paid experiences. In addition to the theoretical contribution, this is useful knowledge for anyone involved in the development and design of experiences. Third, conducting the study as a survey methodologically complements the body of experimental studies that measure sensory response. Fourth, and finally, and in line with recent studies (i.e. Lv et al., 2020; Yang et al., 2021), by connecting the sensory dimension of an experience and positive memory, we contribute to the growing literature on the effects of bodily experiences and outcome in tourism research.

Staging memorable experiences

Sensory tools in experience design

It is widely acknowledged that in order to understand human cognition, we need to take into account how people interact with the world through their senses (Krishna & Schwarz, 2014). Sensory impression theory emphasizes that the individual perceives the world through the senses, and the long-term memories of physical experiences have a direct influence on people's attitudes and behaviours (Agapito et al., 2014). Stimuli are external cues in the environment that stimulate the sensory receptors (Agapito, 2020; Goldstein, 2010). These receptors send sensory information via electronic signals to the brain, which then generates sensations. Feedback is then activated in the form of an emotional experience as a response to these stimuli (Feng, 2010). Hence, the sensory system perceives the surrounding world, the affective system evokes emotional responses to stimuli, and the cognitive system makes meaning and processes information (Meacci & Liberatore, 2018). Finally, the experience is internalized and becomes a memory.

The sensory tools used in experience design have been developed from our knowledge of sense perception. The smell is the most sensitive sense; it can be evoked without direct contact with the source and remembered with 65% accuracy after a year (Sand et al., 2006). While vision is perhaps the most important sense on-site, visual memory accuracy decreases to 50% after only three months (Sand et al., 2006). Taste is guided by similar taste experiences in the past, body condition, and the visual, olfactory, and tactile parts of the tasting experience (Sand et al., 2006). Hence, the taste is less accurate for a person with a cold or who is blindfolded. Touch is the most instant and bodily of the

five senses (Sand et al., 2006), involving a deeper connection between the one who touches and the object that is touched. By permitting and encouraging people to touch artefacts and installations, their experience is intensified. Sound and soundscape are known to evoke feelings and are thus heavily used in moviemaking, stores, and restaurants.

For experience providers, it is important to acknowledge that how senses are perceived. Their effects differ according to personal preferences and a person's state of mind/mood (Sand et al., 2006). Also, senses are triggered by change, and the effect of a sensory tool is strongest just after stimulation. Hence, the first snow in autumn makes the greatest impression, and the sound of traffic seems less annoying after a while.

Although the body of literature on senses in experience design has increased in recent years, there is much that remains unknown. First, many studies cover only one sense (for a review, see Agapito et al., 2013). Others have reported respondent difficulties in separating the relative effects of the different senses (e.g. Dițoiu & Cărunțu, 2014), making it difficult to draw conclusive correlations. To investigate the significance of different senses, Agapito et al. (2012) used a single-item scale and asked respondents to evaluate the extent to which sight, hearing, smell, taste, and touch contributed to the intensity of the overall experience in a nature park. The results showed that while all five senses were important, their order of importance was vision, hearing, smell, taste, and touch. At the same time, each of the senses was rated *important* or *very important* for the intensity of the overall experience for at least 80% of the respondents, underscoring the coexistence of the senses.

A more recent study of the sensory dimension of tourist experiences, also in a natural park, obtained similar results (Mateiro et al., 2017). The respondents indicated vision as most important, followed by hearing, smell, taste, and touch. The visual sense seems prominent in tourism settings, yet researchers have argued that other sensory modalities must be in place to fully perceive the environment (Agapito et al., 2012, 2013, 2014, 2017).

Experience evaluation and a positive memory

A positive, memorable tourism experience has been operationally defined as 'a tourism experience positively remembered and recalled after the event has occurred' (Kim et al., 2012, p. 13). When experiences turn into memories, they play an important role in how people later refer to an experience. Positive memories can be looked at as an important identification of customer satisfaction with an experience and later predictor of behavioural intentions.

In a comprehensive qualitative study of memorable tourism experiences, Tung and Ritchie (2011) found positive emotions to be associated with the extent to which the journey met the traveller's expectations, if it provided some sort of personally perceived importance (e.g. enhancing social relationships, intellectual development, self-discovery or overcoming physical challenges) and to what extent the traveller collected memorabilia from the journey. Oh et al. (2007) associated memorability with a subjective feeling in individuals involved in an activity at an emotional, physical, spiritual and/or intellectual level. Brakus et al. (2009) connected personal brand experiences to sensory, affective, intellectual, and behavioural components.

In tourism, the connection between sensory experiences and satisfaction has been documented in several studies (e.g. Agapito et al., 2014, 2017; Kim & Perdue, 2013). Nysveen et al. (2018) found that sensory and activity-based factors had a positive effect on tourists' hotel satisfaction. In two recent studies, positive sensory experiences were found to increase destination loyalty (Lv et al., 2020; Yang et al., 2021). Lv et al. (2020) also found that positive sensory impressions have a positive effect on other outcome variables, such as perceived value and satisfaction. In a study of 304 tourists visiting the World Heritage site Wuyi Mountain in China, Yang et al. (2021) found a positive impact of sensory experiences on emotions, memories, and loyalty. They determined that sensory experiences aroused emotions, which positively influenced travellers' memories and this increased tourists' loyalty.

Although sensation and perception are central to and precede almost all aspects of reflection, behaviour, and cognition following an experience, more research on coherence between the sensory aspects and customer evaluation of an experience is needed (Agapito, 2020; Agapito et al., 2017; Lv et al., 2020; Meacci & Liberatore, 2018). Building on the above, we propose that staging experiences with sensory tools will increase travellers' positive memories of an experience, and that this effect will be partially mediated by cognition and affection.

H1: Staging experiences with sensory tools increases positive memory.

H2: The relationship between sensory tools and positive memory is partially mediated by effects on cognition and affection.

Study 1: effects of sensory tools on experience evaluation

Overall design and measurement

This study was conducted through two case studies based in two museums near Oslo, Norway. While artefacts and exhibits remain the focal point, museums increasingly include various activities and events in their experience. A modern museum is a place for learning, adventure, meeting people, recreation, and reflection. Indeed, Levent and Pascual-Leone (2014) called the museum experience 'a multi-layered journey that is proprioceptive, sensory, intellectual, aesthetic, and social' (p. xiii).

Both museums used sensory tools to enhance visitor experience and satisfaction. We compared the effects of different senses on the dependent variable (satisfaction with the experience). Accordingly, emphasis was placed on uncovering direction and finding significant differences in effects between the different senses. Explanatory power was given less weight (Hair et al., 2015).

The sensory tools were measured similarly to Agapito et al.'s (2012, 2017) studies. Respondents were asked to assess to what extent vision, hearing, smell, taste, and touch contributed to the intensity of an overall experience:

At the Old Hvam Event (or Norwegian Museum of Science and Technology) you have the opportunity to experience history (or history and technology) with multiple senses. How important are the different sensory tools for your evaluation of the experience? Circle the answer that works best for you, from not important at all (1) to very important (7).

Thus, each item was measured for each sensor on a 7-point Likert scale. The question was followed by a list of the relevant senses that made up the experience. The taste was left out in this study because it was not part of the staged experience offered at either the Old Hvam Event (OHE) or

Table 1. Respondent profiles.

Demographics		OHE	NMST	Consumer panel
N		47	76	274
Sex	Male	53%	46%	51%
	Female	47%	54%	49%
Age	16–30	13%	25%	24%
	31–59	55%	67%	49%
	60+	32%	8%	27%
Education	Mandatory	57%	29%	35%
	Bachelor	28%	42%	32%
	Master or above	15%	42%	32%
Repeat visitor	Yes	70%	84%	–
	No	30%	16%	–
Company	Alone	–	4%	6%
	Friends & family	–	88%	89%
	Organized group	–	8%	5%

the Norwegian Museum of Science and Technology (NMST). However, it is possible for visitors to buy food or even bring their own picnic to both places. The questionnaire was distributed in Norwegian only. [Table 1](#) presents the respondents' profiles.

The cases



The Old Hvam is a living museum with exhibitions related to agriculture, crafts, and farming culture at Romerike, close to Oslo. In addition to permanent exhibitions in the various buildings on the farm, the museum has temporary exhibitions. The season ends every year with the OHE, which includes an open-air worship service, open museum, demonstration of old handicraft techniques, folk dances, folk music, children's activities, and plays with historical themes.

The NMST is a national museum with permanent exhibitions related to technology, industry, and science. It also regularly stages short events, such as physics and astronomy shows. The museum has 250,000 annual visitors who come to see more than 25 permanent and temporary exhibitions on energy, oil, industry, medicine, airplanes, cars, and trains. The museum also includes the Oslo Science Centre, an interactive centre that promotes fun through learning and exploring the natural sciences and technological principles within the themes of energy, physical phenomena, mathematics, and space. On weekends and during holidays, the museum holds a series of shorter science shows conveying knowledge of astronomy, chemistry, and physical laws with the help of communicators who use sounds, smells, and the involvement of the public to increase engagement. The characteristics of the two museums' uses of sensory tools described by the museums themselves are listed in [Table 2](#).

Data collection

At OHE, we manually collected data on-site during a 4-hour event marking the end of the season. The data were a combination of a pilot survey completed by 47 participants, informal talks with guests and guides and on-site observations. All the visitor respondents in the study resided within an hour's drive from the museum and were regular visitors. A few days later, a group interview was conducted with three museum staff members, who were asked to reflect upon the pros and cons of using

Table 2. Sensory impressions.

Data type	OHE	NMST
Image		
Description	Regional museum located near Oslo	National museum located in Oslo
Data collection technique	Outside the living history museum during the yearly end-of-season event	In the museum during ordinary operation
Visual	Colours, costumes, old farm buildings, activities, landscape, garden, animals	Exhibits, texts, experiments
Tactile	Taking part in activities such as petting animals, touching old buildings, handling farming tools	Participation in delimited activities and experiments, touching items in exhibits, co-creation in shows
Odour	Smells from the animals, trees, flowers, farm life, old bakery, old tractors (exhaust); odour box in exhibition	Smells accompanying exhibits (odour boxes) and shows
Sound	Sounds from activities, folklore music, people chatting, animals	Sounds accompanying exhibits and shows

sensory stimuli in a museum setting and a living museum in particular. Beforehand, it was clarified that their reflections were not to be limited to the OHE.

At NMST, data collection took place during several weeks of normal operation. First, a flyer with information about the project and a QR code and URL leading the respondents to a smartphone-adapted survey was distributed from the on-site ticket office, museum shop, and cafeteria. Those who agreed to take part in the study did so by using their own phone, either on-site or later at home. After an initial review, 76 completed questionnaires were included in the study. The majority had visited the museum several times and thus came knowing what to expect. An expert interview with the museum exhibition manager was also conducted to get an idea of how the museum used sensory tools in connection with exhibitions and events. Observations and conversations with visitors during the first weekend of data collection were reported in the authors' field notes.

Old Hvam event

The survey data from the OHE showed that the visitors rated sound and vision as the two most important senses, with 76% and 73%, respectively, rating these senses as important or very important. For touch and smell, 68% and 64%, respectively, rated these as important or very important. An overview of the respondents' assessment of the sensory instruments is displayed in [Figure 1](#). These results partly correspond with the studies conducted by Agapito et al. (2012, 2014, 2017), who reported that while all senses were in play when respondents evaluated an experience, the visual was the most important. At OHE, the sound was found most important, closely followed by the visual.

Through the informal talks that the authors conducted with visitors at the OHE, we found the respondents to be less aware of their own senses than anticipated. Though they acknowledged arousal of their senses as important for their overall experience, in general, they reported an unconscious use of their senses and stated that they had not really reflected on the subject. A typical response was, 'I have never really thought about how I use my senses; they're just there'.

In the following group interview with the museum personnel, the lack of attention given to sensory tools was discussed. One of the reasons why scents and sounds are less commonly used instruments than vision and touch is that they are difficult to isolate in open exhibitions, and doing so may potentially disrupt other parts of the experience. This can be illustrated with a quote from one of the employees. After ordering a rope for an exhibition, she expressed concern about its smell: 'I was concerned that the smell of tar would be too dominant and evoke negative emotions in visitors when entering the room'.

We also asked about touch as an ongoing dilemma in museum design. An Old Hvam employee reported they had to remove a particularly valuable item from its display because visitors did not respect the rope that separated the item from them. In another part of the exhibition, they

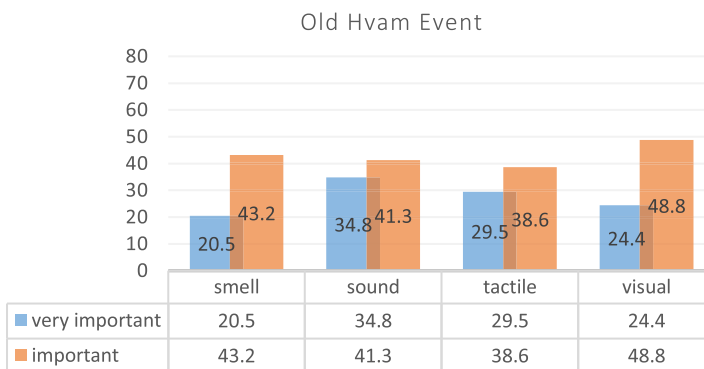


Figure 1. Importance of senses and Old Hvam living museum of cultural and social history.

solved this problem by providing replicas of historical fabrics for the visitors to touch, with the original fabric on display behind glass. According to Bacci and Pavani (2014), aside from the damage caused by transport, the most frequent damage to artwork is caused by visitors' disregard for the museum's request to not touch the displayed items.

For most visitors, the OHE was a tradition, and meeting family and friends was an important part of the experience. 'We come here every year' and 'It's a tradition for us' were two common statements. The familiar cultural landscape, the smell of horses, and the taste of sour cream porridge gave them a sense of nostalgia. The visitors expressed a desire to share these impressions and emotions with their children and grandchildren.

Norwegian museum of science and technology

Like Old Hvam, NMST also had a large number of repeat guests, and almost nine out of 10 were visiting with friends and family. Hence, the respondents were generally familiar with what to expect when visiting.

The findings showed that the possibility of circulating and touching objects is what mattered most to the majority of visitors at NMST. While almost 88% of visitors indicated that touch was very important or important, the corresponding figures for smell, vision, and sound were 26%, 49%, and 52%, respectively. The results are illustrated in Figure 2.

However, the numbers changed when isolating the responses related to the staged science show performed at scheduled hours during weekends. Here, 43% considered on-stage visuals as being important or very important, while 38% and 24% felt this way for sound and smell, respectively. These results correspond with what Pine and Gilmore (1999) referred to as the entertainment realm, where the customer is passive and absorbs the activity. Hence, the tactile sense was not prominent.

Discussion

Inspired by Dițoiu and Cărunțu (2014), Figure 3 illustrates a sensory profile created for the two museums based on the respondents' perceived values ascribed to sensory stimuli.

Despite the differences between the museums and the limited number of respondents, we found substantial similarity between how respondents in the two contexts assessed the importance of sensory stimulation. As found in previous studies (e.g. Agapito et al., 2012, 2014, 2017), the visual experience was considered important by the visitors at both OHE and NMST. However, the sound was the most important at OHE, and tactile aspects were the most important at NMST. In line

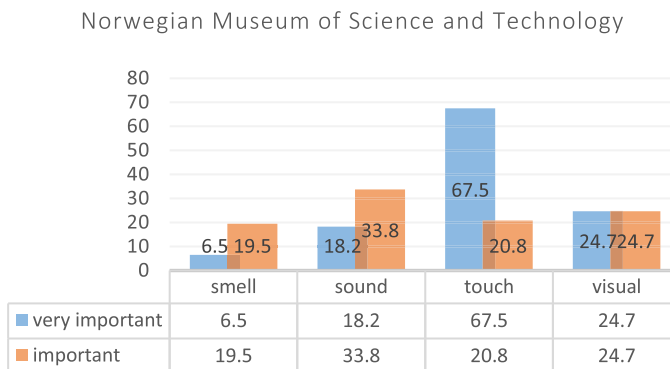


Figure 2. Importance of senses and Norwegian Museum of Science and Technology.

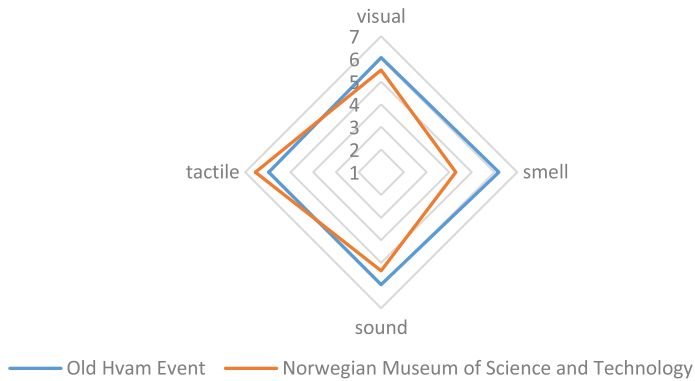


Figure 3. Sensory profiles.

with Agapito et al. (2012, 2014), differences in how the respondents valued the other senses were minor.

Further, the investigation supported the findings elaborated on by Engeset and Elvekrok (2015), who argued that visitors are attracted to the stimuli that organizers emphasize. At NMST, the possibility of touching surfaces (tactile) was considered very important, while the smell was of little importance in experience evaluations. This result mirrors the museum's emphasis on developing touch surfaces and activity spaces in exhibitions in general and through the interactive science centre in particular. However, the smell was only consciously used in the on-stage science shows. Several studies have shown that organizers who direct attention to manipulative factors they deliver well find that these factors are better remembered when visitors evaluate customer satisfaction with an overall experience (e.g. Engeset & Elvekrok, 2015; Rahman et al., 2017).

Study 2: the effects of sensory stimuli on a positive memory

Design and procedure

Acknowledging that people are rarely consciously aware of everything they hear, see, smell, taste or feel (Agapito et al., 2013, 2014), and taking known interactions and synergies between senses into account, Study 2 was conducted with a holistic view on senses. The study was carried out as a survey in Norwegian only and distributed to a Norwegian consumer panel through one of the leading European data collector agencies for market research. The data collection was conducted online until 300 complete responses were reached (approximately one week). This study was not limited to a museum context but included a variety of staged experiences.

Participants were instructed to think of one (paid) experience in which they had participated during the last 12 months, describe the experience in their own words and then indicate agreement with statements regarding the experience in question. We received 274 valid responses based on the criteria: the respondent had a thorough description of the experience they related to, and they verified that they remembered the experience well/very well. The respondents based their experiences on visits to museums, amusement, theme, and water parks, zoos, concerts, festivals, theatres, cinemas, heritage sites, churches, cities and destinations, and sporting events. The respondents were located all over Norway. The majority of the respondents had visited the experience with family and friends. See Table 1 for respondents' characteristics.

The study measures were inspired by previously validated measures in other contexts. In line with Study 1, single items measured each sense. Further, we built on the scale for sensory, affective, and cognitive dimensions of a brand experience that was developed by Brakus et al. (2009) and later tested in several empirical studies (e.g. Nysveen et al., 2018). All items are included in Table 2.

The *sensory* dimension captured the impression the experience had on consumers and the degree to which it appealed to their senses. The respondents were asked to what degree the experience made a strong sensory impression, appealed to their senses and stimulated their senses. Their responses to the three items were captured on a 7-point Likert scale from (1) not at all to (7) to a great extent. The middle point (4) indicated a neutral response.

The *cognitive* dimension referred to how the experience affected curiosity, reflection, and learning. The respondents were asked whether they had learned something new from this experience, it had made them think and it had stimulated their curiosity. Responses to the three items were captured on a 7-point Likert scale from (1) not at all to (7) to a great extent.

The *affective* dimension reflected the strength of the emotions and feelings the experience provided. Respondents were asked to what extent the experience engaged their feelings, aroused feelings in them, and left them with strong emotions about the experience. Responses to the three items were captured on a 7-point Likert scale from (1) not at all to (7) to a great extent.

Positive memory was operationalized through a combination of three questions related to experience evaluation. Respondents were asked if they were content with the experience, happy about their choice, and had happy memories of the experience. Responses to the three items were captured on a 7-point Likert scale from (1) not at all to (7) to a great extent.

Findings

After a preliminary examination through which missing and inapplicable data were dismissed, the dataset was imported into SPSS (IBM) for further analysis. The first descriptive analysis of the data indicates acceptable variation in the material (Hair et al., 2015). We used principal component analysis with Kaiser rotation to confirm the factor structure. All remaining items had factor loadings well

Table 3. Data analysis.

Survey question	Positive memory	Cognition	Affection	Sensory
I learned something new from this experience.	–	0.757	0.233	–
The experience made me think.	–	0.978	–	–
This experience stimulated my curiosity.	–0.197	0.779	–0.141	0.124
I am content with the experience.	–0.930	–	–	–
I am happy that I chose this experience.	–0.958	–	–	–
I have good memories from this experience.	–0.868	–	–	–
This experience engaged my emotions.	–	–	0.729	0.190
This experience aroused feelings in me.	–0.187	–	0.768	–
I have strong emotions about this experience.	–	–	0.434	0.425
This experience made a strong sensory impression.	–	–	–	0.931
This experience appealed to my senses.	–0.104	–	–	0.870
This experience was stimulating to the senses.	–	–	0.142	0.825
Number of remaining items	3	3	2	3
Correlations ^c				
Positive memory	–	–0.541*	–0.496*	–0.635*
Cognition	–	–	0.513*	0.610*
Affection	–	–	–	0.681*
Cronbach's α^a	0.943**	0.883*	0.775** ^b	0.910*
Mean (SD)	5.60 (1.40)	4.65 (1.53)	4.77 (1.46)	4.39 (1.52)

Notes. Extraction method: Principal component analysis. Rotation method: Oblimin with Kaiser normalization. Rotation converged in 10 iterations.

^aSignificant at * $p < 0.05$, ** $p < 0.01$

^bCorrelation between two items

^cAll correlations significant at $p < 0.01$.

above 0.5, indicating convergent validity, and a distance to other factors above 0.2, indicating discriminant validity (Hair et al., 2015). A correlation analysis revealed no multicollinearity problems. The Cronbach’s alphas were all above 0.7, indicating the reliability of the scales (Hair et al., 2015). The results of the data analysis, including means and standard deviations for the constructs, are illustrated in Table 3.

H1 was tested using regression analysis (Table 4). The models’ explanatory power was measured by adjusted *R*-squared, while the standardized coefficient betas were used to compare the strengths of the different variables included in the models. The *F* and *t*-tests are not reported directly but rather by flagging significant results. First, we tested the influence of the sensory dimensions on customer satisfaction (Model 1). In support of H1, the results showed that the sensory dimension of the experience explained 45% of the changes in explanatory power in the panel study. Then, we extended the model by including cognitive and affective dimensions as independent variables (Model 2). The analysis showed that sensory, cognitive, and affective dimensions all have a significantly positive influence on customer satisfaction. However, including all three variables only increased the models’ explanatory power by 6%, as Model 2 explained 51% of the changes in experience satisfaction.

We used Hayes’s (2018) fourth model to test H2. Sensory was the independent variable, satisfaction was the dependent variable and cognition and affect were mediator variables. The results showed support for H2 as the confidence intervals of the indirect effects did not straddle zero for any of the mediating variables (Cognition: $b = 0.15$, $SE = 0.04$, 95% $CI = 0.06, 0.23$; Affect: $b = 0.19$, $SE = 0.08$, 95% $CI = 0.03, 0.33$). Moreover, the direct effect of the independent variable was also significant, indicating a partial mediation effect. The results from the mediation test are illustrated in Figure 4.

Discussion

The first objective of this study was to investigate the relationship between an experience’s sensory dimension and positive memory. The analysis showed that sensory experiences have positive influences on overall positive memory of the experience.

Table 4. Regression solution (all significant at $p < 0.01$).

Model	Independent	Dependent	
		Positive memory (β)	
Model 1	Sensory	.670*	.446*
Model 2	Sensory	.327*	.506*
	Cognition	.223*	
	Affection	.243*	

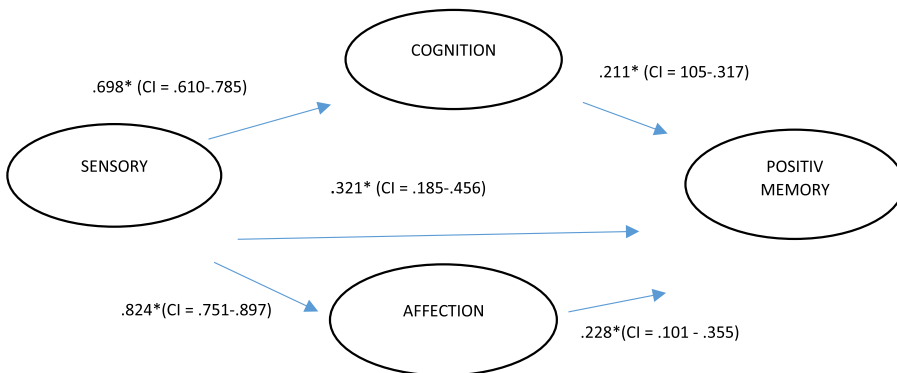


Figure 4. Results of mediation analyses (all paths are significant at $p < 0.001$). $R^2 = 0.511$ ($F = 103.579$, $p < 0.001$).

The results show support for H1, which is in line with previous research in related contexts (e.g. Brochado et al., 2021; Nysveen et al., 2018; Rahman et al., 2017; Yang et al., 2021). An extended model that investigated the effects of three variables – sensory, affection, and cognition – on satisfaction resulted in a limited increase in explanatory power. All three variables had positive and significant effects on satisfaction with the experience. This can be contrasted, in part, with earlier research in related contexts. For example, in a study of positive memory with hotels, Nysveen et al. (2018) found cognition to be negatively correlated with positive memory but failed to find support for a relationship between affection and positive memory.

H2 predicted that the relationship between sensory experiences and positive memory were partly mediated by affective and cognitive dimensions. The results show full support for H2. This adds to earlier research in related contexts, which has shown that an experience is composed of several dimensions affecting how people perceive the experience and remember it post-experience (Agapito et al., 2017; Brakus et al., 2009; Nysveen et al., 2018). Further, we found that senses have both direct and, through cognitive and affective mediators, indirect effects on positive memory. This is important because it shows that conscious use of sensory tools in staging experiences can have both direct and indirect influences on how a visitor perceives positive memory with an experience.

Conclusions

This study investigated the importance of sensory tools in producing positive customer memories of staged experiences. The findings were based on two studies. First, two case studies were conducted with mixed methods to understand how providers use sensory tools to support staged experiences and how visitors value the different sensory stimuli used. Second, a survey was used to investigate the relationship between sensory stimuli and positive memory of an experience. These findings contribute to both theory and practice.

Theoretical contribution

First, the findings illustrate the complexity of the sensory experience concept, supporting earlier studies by Agapito et al. (2013, 2014, 2017) and Diđoiu and Căruntu (2014). Our study shows that visitors in general hold a multisensory perspective when evaluating experiences. This is in line with earlier research into multisensory phenomena (e.g. Bacci & Pavani, 2014; Brochado et al., 2021; Levent & Pascual-Leone, 2014). However, the case studies show that visitors tended to be unconscious of their senses, only registering positive memories (i.e. having a good time) and not the role that stimulation of their senses played in their positive memory. This finding was particularly prominent for smell.

Second, the results support the notion of an experience's ability to influence learning, engage feelings and stimulate senses. The link between senses and positive memory was confirmed in both the museum contexts (Study 1) and in the panel with respondents who had participated in broader paid experiences (Study 2). These findings support earlier studies in other contexts (e.g. Agapito et al., 2017; Brochado et al., 2021; Prayag et al., 2017; Yang et al., 2021).

Third, our findings add to the literature by demonstrating that organizers can direct visitors' attention to certain aspects of their product by conscious use of sensory tools. This was prominent in the study of the NMST, where the possibility for the visitors to *touch and circulate the items* were seen as most important. Increased understanding of perceived primary and secondary characteristics of an experience is of both practical and theoretical interest. The findings illustrate that sensory tools can be a means for organizers to focus on the attributes in which they are skilled and thereby guide visitors' attention to the parts of an experience that the organizers can most easily contribute to a positive memory.

Finally, the study illustrates difficulties associated with measuring sensory experiences in the field. For respondents, it is challenging both to distinguish the value of the different sensory elements included in an experience and to identify the locations of sounds and scents. This is perhaps especially relevant when experiences take place in open landscapes. At the OHE, both informal conversations with respondents and the following group interview with the conservators and management revealed that competing sounds made it difficult for visitors to distinguish between them. In the outdoor museum, sounds from old vehicles, utensils and animals blended with sounds from stage performances and people chatting, making sound stimuli a less relevant sensory tool. Nevertheless, taking the features of sensory experiences into account, it is important to continue to do research in real-life field settings.

Implications for managers

First, insights into the effects of the different dimensions studied herein can enable managers and experience organizers to develop strategies that may increase the attractiveness of their experiences. Knowledge of where and when to invest money in tools that enhance the experience can guide organizers in choosing between design elements to direct customers' attention to certain properties or parts of an experience. Research has shown that when attention is directed to the properties where the organizer holds control and delivers well, the customer tends to emphasize this element when rating a positive memory with the overall experience (Engeset & Elvekrok, 2015).

Second, while using different sensory tools to stage experiences has a positive impact on the assessment of an experience, implementation can be demanding. Study 1 gave insight into the challenges that occur when sensory tools are used in non-enclosed settings, taking odour as an example. Ensuring that the intended smell does not conflict with or compete with other smells can be difficult. Natural (un-staged) conditions caused by smells, sights or sounds might interfere with staged senses and affect the experience in an unfavourable manner (Keller, 2014). This is in line with previous findings in similar settings (Bishop, 2017). Therefore, organizers of experiences need to be aware of sensory tools – both those that are staged and in relation to natural and random stimuli in the environment. Further, our study shows that the prominence of different senses varies.

Finally, our study confirms that organizers who direct attention to factors where they excel find that these factors are emphasized and remembered when visitors assess their positive memory with the overall experience (Engeset & Elvekrok, 2015; Rahman et al., 2017). Experience providers should include all senses in the planning process in order to make a conscious decision about what to include, omit or highlight. The aim is to give the customer a holistic experience in which various elements do not compete but complement each other, resulting in a satisfied customer with a memorable experience. For museums in particular, senses should be activated by facilitating touch exhibitions (when there is no risk of destroying the artefacts) or by adding smell and sound when possible without disturbing other exhibits. By connecting the sensory dimension of staged experiences and positive memory, we contribute to the growing literature on effects of bodily experiences and outcome in tourism research (Lv et al., 2020; Yang et al., 2021).

Limitations and future research

The study's limitations create opportunities for further research. First, the museums in Study 1 differed from many other experiences that have been discussed in the literature in that a large proportion of the visitors were revisitors living in the region. While recent studies have illustrated that experience satisfaction does not necessarily lead to repurchase, our study seems to propose differently. A possible avenue for research is to investigate the influence of proximity to the experience on the relationship between positive memory and repurchase/behavioural intentions.

Second, a holistic view of senses as tools for creating memorable experiences implies the need for further research on the impact of each specific sense. As much as our choice of a survey

methodologically complements the body of qualitative and experimental studies that measure sensory response, our study illustrates the problems associated with measuring sensory impact in a field setting. It is challenging for respondents to distinguish between the value of the various senses that form a holistic experience. Future research should investigate settings where visitors are exposed to different sensory elements in a particular manner. Field experiments may be applied as a method provided the researcher is able to control the sensory stimuli. By adding or removing sensory stimuli during a real-life experience, we can gain insight into how different senses affect an experience.

Third, the aim of this research has been to investigate the relationship between sensory stimuli and positive memory within a staged and paid experience context. We acknowledge that sensory experiences are not always positive. At Old Hvam Museum the staff reported concern about possible negative impact of distinct non-intended odours. Further studies should take the possible impact of negative sensory experience into account.

Finally, future research should consider both context-related differences and the impact of socio-demographic characteristics on how individuals respond to and value different sensory stimuli. Although, beyond the scope of our study, we acknowledge the emerging use of AR/VR technology in experience design, and encourage further research in this field.

Disclosure statement

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