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The Scent of Art. Perception, Evaluation, and Behaviour in a Museum in Response to Olfactory Marketing

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Abstract: Olfactory marketing has been increasing its presence in commercial environments in recent years thanks to its influence on perceptions, evaluations, and behaviour. However, the number of scientific studies on the issue is limited, and this is even more true for nonprofit environments. The aim of this experiment is to provide empirical answers about the influence of smell on the evaluation and behavior of the consumer of nonprofit services, specifically the museum consumer. For this purpose, an experiment was carried out at the González Santana Museum over four weeks in March and April 2017, during which three rooms in the museum were filled with scents considered to be congruent. The results obtained from the MANCOVA analysis demonstrate scent having a significant influence on perceptions and evaluations, as well as on the intentions to revisit the institution, and significant repercussions for management and researching can be derived from this.

Keywords: ambient scent; behaviour; evaluation; MANCOVA; museum; olfactory marketing

1. Introduction

In recent years, the role of sensory marketing has been gradually gaining in importance and has managed to position itself as a useful tool with which to attract and retain customers, and with which to optimise the consumer experience in aspects such as purchasing and consumer perceptions of the product or shop [1–4].

However, not many authors have ventured into studying the influence of the scent variable [5,6]. This is due to the difficulty of controlling and predicting this sense and its influences [7]. This difficulty derives from its enormously subjective and personal nature, influenced by the consumer's motivations [8], or its association with moments or people [9], as well as other variables such as the consumer's gender [10]. These limitations mean that the sense of smell has not been well studied until now in the field of sensory marketing [5,11–17]. Despite this, it is worth noting that its study has experienced a gradual growth that has been increasing over the last decade, especially in the United States, a country that represents 41% of research in this field, with 10 authors accounting for 40% of publications.

The study of scent and its influence on the consumer, especially in the evaluative and behavioural aspects, is of vital importance. This importance derives from the fact that it is the only sense that cannot be consciously annulled for a long time, influencing approximately 75% of the emotions experienced daily by humans [18,19]. In addition, more than 90% of our responses as consumers are formed at the subconscious level, where odor plays a fundamental role [20]. It also affects the state of mind and produces a greater memory [21] for a longer time [21–26], becoming a sense that is 'long-lasting' [27] thanks to its strong resistance to interference [28]. Examples include the studies of Engen and Ross [29],

who conclude that the memory of a scent decreases from 70% just after exposure to 65% after one year, and that of Lawless and Engen [28], whose data imply a reduction from 85% to 75% one month after exposure, compared to more pronounced memory decreases for other senses such as sight, which decreases from 99% after exposure to 59% four months later [30].

Its influence, however, depends on four essential variables or characteristics: presence [31–35], pleasantness [21,33,34,36,37], intensity [38] and congruence [32,33,36,39–42]. This final aspect is defined as the mental association that the consumer makes between scent and the environment or product. However, odor has been shown to have an impact on consumers with its presence alone, regardless of whether there is congruence [43]. For this reason, we have chosen to use in this study odors that have already been established by previous studies as being congruent and to study only the impact of their presence in a nonaromatized environment.

Scent, therefore, has a direct influence on human emotional states, on the associations and evocations of memory and on the opinions about products and environments [44,45]. Therefore, there is a compelling need to use it to create value judgements about the product, shop, and purchasing environment [46]. This influence is of enormous importance if we consider that one of the most relevant changes that has occurred in the way we purchase is precisely that the consumer no longer only looks for the objective quality and features of the product itself, but instead yearns to create a unique experience in their mind that derives from the pleasure of purchasing as a whole oriented towards their satisfaction [47–49].

This study has been designed starting from this premise, that of the influence of scent as a system to create a suitable and pleasant environment [50–52]. This study aims to extend olfactory marketing to nonprofit environments, starting from the methodology used in shopping centres. We try to explain the influence of scent in customers' evaluations and behaviours where they are visiting a museum. Within the study of user/customer evaluation, it is increasingly common to apply scents to environments not identified as 'purely commercial,' such as hospitals [53], dental clinics [54–56], book stores [46,57], art galleries [58], or schools [59,60].

Therefore, this study has been structured into four essential parts. In the first part, a bibliographical review has been carried out of the elements affected by scent, such as perception, evaluation, and behaviour. The second section contains a description of the methodology used. This is a methodology little used to date to compare the means of the different factors, as well as the impact of gender. Thirdly, the results of this study are presented. Finally, there is a conclusions section, which also details the limitations of this study and its future extensions.

2. Literature Review

2.1. Olfactory Marketing and Perception

Scent has a significant influence on consumer perceptions, as demonstrated in various studies [44,61–65]. Scent is vitally important in this subjective perception to be able to create a feeling of greater quality and in this way increase consumer spending in commercial environments [44,62,63,66]. The perception of quality, for example, can have both a positive influence, meaning to say that it makes consumers approach and desire the product, and a negative influence, or in other words, it puts consumers off [32,46,67]. This has been one of the original characteristics studied in olfactory marketing, as evidenced by the existence of a study from 1932 that demonstrated that 50% of consumers perceived socks with a scent as being of higher quality, compared to 8% who were indifferent to this stimulus [68].

Moreover, the presence of scents and their appropriate use can lead to the same spaces, and in the presence of the same number of people, being perceived as larger and more open [69]. Other authors have shown that there was no significant direct effect of scent on social density perceptions, but 'there was a significant indirect effect of scent on social density perceptions through associations with warmth' [70]. This issue acquires enormous importance in certain environments in which the interest of the institution is to attract the largest number of simultaneous visits, such as in the case

we are studying or in commercial environments. This excessive agglomeration of people may lead to reduced satisfaction, an important element in the creation of evaluations and in intentions and behaviour [71]. Therefore, it is of vital importance to control this feeling of freedom, since an increase in the sense of space will lead to greater satisfaction, which will, in turn, lead to an improvement in the desired behaviour [72].

All of this leads us to suggest the following hypotheses:

Hypothesis (H1). *The presence of a scent leads to an improved general perception among visitors to a museum, with regard to its exhibitions, compared to a scenario without the presence of scent.*

Hypothesis (H2). *The presence of a scent increases the perception of space and reduces the number of people perceived to be present.*

Hypothesis (H3). *The presence of a scent leads to improved perceived quality among visitors to a museum, with regard to its exhibitions, compared to a scenario without the presence of scent.*

2.2. Olfactory Marketing and Evaluation

One of the key aspects and most important contributions of olfactory marketing is undoubtedly its influence on the evaluation. While perception refers to aspects such as quality, space, and other related aspects, evaluation refers to the score that the consumer gives to the product itself, in the case of our study, to the showroom that one is visiting in each moment of being there. This improvement results in a more favourable memory of the experience and a greater propensity to return to the place where it occurred, as shown in the studies carried out by Bourgeon-Renault, demonstrating an increase in repeated visits to art institutions [73].

Also within the art sector, Cirrincione et al. demonstrated the importance of olfactory marketing on the emotional influence of visitors and, consequently, on the evaluation of the art. These authors reached the conclusion that the presence of scents positively affects the evaluation that visitors make of a work of art, and, therefore, rule out the premise that a work is only valued for its 'artistic quality' [4].

However, if there is one nonprofit area in which the influence of scent has been extensively examined, this is the field of health, where different experiments have demonstrated the influence of scent on the experience and evaluation of the services received. In both children's hospitals, where children aged between 8 and 12 and their relatives and professionals were surveyed [53], and in dental clinics [54–56], the results showed that the evaluation of the service received increased and there was a reduction in anxiety about a good that functions as a 'negative good.'

Very similar to the artistic-culture environment is the experiment by Doucé et al. (2013), who found a positive influence of the scent of chocolate on the evaluation of books, although this influence derives from and is only experienced in the event of the existence of congruence between the environment and the scent.

Some authors have shown that the aromatized environment directly influences both the perception of time and the amount of time that customers are willing to spend in the store [33,57,74–76]. Time in itself is a variable of vital importance and influence on the general satisfaction of the consumer with the product purchased or the service received [77], since there is an important difference between the objective and the subjective time [78] and it may be affected by environmental conditions [77], especially odor [35,74]. Despite this importance, this variable is not of interest for the study, given that the visits were guided and the duration established by the museum itself is one hour.

This leads us to suggest the fourth hypothesis for our work:

Hypothesis (H4). *The ambient evaluation carried out by the museum's visitors is greater in those cases where the room is scented.*

2.3. Olfactory Marketing and Behaviour

Scent, understood as ambient, exerts a proven positive influence on satisfaction [37,46,63,79–82].

This increase in satisfaction will lead to improvements in consumer behaviour or intended behaviour, such as the selection and repetition of behaviour [83].

One of the main effects of olfactory marketing is clearly the ability to make customers return to the shop [32,33,57,84], as the experience created and stored makes consumers return to the shopping centre in order to make a new acquisition [32,33,57,85]. This effect is confirmed in the case of visits to art institutions, as where there is a scent this causes an increase of intention to repeat visits to that institution [73]. That is why this experiment attempts to replicate this effect whilst considering intention as a key factor, instead of actual behaviour, and considering this intention as the best indicator of the ability and real desire to initiate this behaviour [86,87]. This implies that brand loyalty increases when there are ambient scents, due to an improved experience [4,88], and there is an increase in the number of people who enter the institution and wish to return [52].

In addition, olfactory marketing posits that another of the main influences of the smell is inducing the consumer to spend more money in the store [52,63,74,80,84,89]. Since this study is based on nonprofit areas, specifically a museum, this hypothesis does not apply. In Spain, compared to other countries, museums have a fixed cost, a standard entry fee with various price discounts for interest groups, which is why it is not appropriate to make this aspect a part of the study.

Therefore, our fifth and sixth hypotheses are proposed as:

Hypothesis (H5). *The presence of a scent leads to improved intended behaviour.*

Hypothesis (H6). *The presence of a scent increases the intention of visitors to revisit a museum.*

2.4. Olfactory Marketing and Gender

Gender is a factor that has been proven to be a determinant in the perception of scent, and therefore in its influence on the act of purchasing. Various studies have focused on gender [84,90,91] as a differentiating element of the perception of scent and its influence.

Some studies have shown that men and women respond differently to the same scents [84,92–94], which is why the influence on each gender must be studied to adapt the scent to the company's target segment and take these variables as moderators in the observed effects. In those cases, where there is a segmentation by gender, it is, a priori, much simpler to adapt the scent to the target; however, these disparate influences become more complicated to control in centres where the segmentation is not made by gender, but rather by other objective or subjective variables.

Another aspect to consider in the study of the influence of scent is the observation that it is women who best recognise a scent and who are more clearly affected by it [84,93,95]. They also show greater interest in scents and a greater ability to memorise and recognise them [84,96,97].

For this reason, the gender variable has been included in our study, considering it a fixed factor in the model.

3. Methodology

This study forms part of the experiment carried out at the González Santana public museum located in Olivenza (a small city of 12,000 inhabitants in southwest Spain). This museum is located within a medieval castle founded by the Templars and consists of two floors that have been suitably prepared and air-conditioned for this, in which scenes and places from everyday life in the nineteenth and twentieth centuries are reproduced. This museum has over 5300 pieces exhibited in 28 rooms and receives a total of 48,000 visits annually; it is one of the most visited in the region.

For 4 weeks during the months of March and April 2017, three rooms in the museum were filled with scent, on two different floors to prevent the three scents from mixing with each other, and a sample

of 234 observations was obtained. During this period, a total of 3960 people visited the museum. The sampling procedure has been probabilistic (random) sampling with the objective of ensuring that the sample is as representative as possible. The museum is divided into two different floors. To prevent odors from mixing and for the visitor to perceive an odor clearly not identified, only two rooms were flavoured at the same time, always on different floors, so that the odors could not be mixed. In addition, the interviewers asked the visitors three questions designed to reject some respondents as part of the sample. These questions were whether the respondent was a smoker, had any type of olfactory allergy, or had suffered a cold in the last two weeks. All those who responded positively to any of these issues were rejected as part of the sample.

This study, concretely, studies the influence of the presence of odors that have already been shown congruent. In this way, the intensity variable was previously measured in a pretest in which the museum workers participated.

The selection of scents was carried out following the recommendations of the study by Ward et al. [98] and of the specialised olfactory marketing consultancy that supplied us with the equipment and scents. This company, Ambiseint SL, a national leader in the sector of olfactory marketing, was in charge of selecting the smells that were going to be diffused and conducting the pretest necessary to verify that, in fact, those scents evoked what was desired. In accordance with the confidentiality agreement with the expert company in olfactory marketing, the procedure and the values obtained from the pretest carried out by it are not reported. These scents were defined as congruent and pleasurable by the company's study. The first of the scented rooms represented a bourgeois-class dressing room from the nineteenth and early twentieth centuries. This room was scented with a 'clean clothes scent,' following Ward et al. [98]. For the second room, the kitchen of a working-class family, the scent of apple pie was used. The third room chosen was a representation of a barber shop from the late nineteenth and early twentieth century, which was filled with the scent of aftershave.

Regarding the level of intensity, a pretest was made in the museum during the five days before starting the experiment, testing the various levels that the device allows, reaching the conclusion that intensities 2, 3, and 4 were too high for researchers and employees and that it caused discomfort in them. The responses of the employees were especially taken into account in this aspect, given that they are perfect connoisseurs of the type of public that visits the museum. The employees and the interviewers answered on this question that the odor was too penetrating and unpleasant at intensities higher than 1, as Sandell [89] also reports. For this reason, it was considered that the appropriate level at which the intensity did not show a negative effect was level 1 (30 s of odor every 180 s, with low level of expansion). This pretest follows exactly the same procedure as the recent study conducted by Sandell [89]. In this pretest, intensity 1 was shown to be the most pleasant for 100% of the participants, since all of them defined intensity 2 as too unpleasant and inappropriate. Likewise, intensity 2 produced results in the pretest that indicated that the environment was too modified by the smell and very "artificial".

A device was placed (Servicio Nebulair Mega 1200) in two rooms at the same time, that dispersed 30 s of scent every 180 s, in order to continuously maintain a pleasant scent without excessively changing the environment of the museum, but with enough to cover the square metres of each of the rooms and to be noticeable. The concentration level of the scent was 2 out of 7.

Once the visit had been made, with a guide expert in the material and with an average duration of one hour, the visitors were surveyed. The questionnaire was prepared following Spangenberg et al. [32], using a five-point Likert scale (Appendix A).

The cleaning of the rooms was always carried out at the same time, using the same products and by the same person. The interviewer did not wear any perfume that could interfere with the possible responses of the respondents, and the survey was administered by the visitors themselves and monitored by the interviewer in case there were any queries. In this way, 234 valid responses were obtained, with 8 responses being discarded due to being incomplete.

To facilitate the processing of the data, a factorial analysis was carried out for two reasons. Firstly, it was intended to reduce the dimension of the analysis by collecting, in different factors, the information reported on the large number of variables. Moreover, due to the orthogonality of the factors, the independence of each of them is assured. Thus, we will be in a position to check whether these dimensions coincide with those proposed in previous studies.

Once the factors had been estimated, a MANCOVA of equality of means was used, where the presence of scent and gender act as fixed factors and the factors obtained from the factorial analysis act as dependent variables, based on Spangenberg et al. (2006), in order to identify whether there are differences of means in the evaluations and intentions of museum visitors depending on the presence of the scent and the visitor's gender, as stated in the literature. The proposed model establishes as a null hypothesis the existence of equality of means, and as an alternative hypothesis, the existence of differences between the experimental group and the control group.

4. Results

Of the 234 observations, 132 visited the rooms in the presence of the scent and 102 formed part of the control group, without any scent, with 49.15% of the study's participants being men (see Table 1). The application of Cronbach's alpha for the data collected (0.939) indicates a very high degree of reliability for the scale, measured on a scale of 5 points. These data are obtained from the fact that the observations were from the experimental group (132) and the control group (102). This is due to the fact that only two rooms were flavored at the same time, to prevent odors from mixing between them, with 102 visitors visiting the museum without any type of scent.

Table 1. Sample Description.

Sample: 234	Control Group: 102 Experimental Group: 132
Gender	Women: 119 Men: 115
Average age	40,64 years
Nationality	Spanish: 146 Portuguese: 85 Other: 3

Both the KMO measurement test and Bartlett's sphericity test were also significant. The assumption of homogeneity of variances is accepted (see Table 2).

Table 2. KMO and Bartlett.

Kaiser-Meyer-Olkin Measure	Sampling Adequacy	0.395
Sphericity test	Approx. Chi-squared	5,439,499
Bartlett	GI	210
	Sig.	0.000

The factorial analysis, whose purpose is to identify the existence of factors composed of the variables obtained from the literature, yields the existence of 4 factors as the most relevant results, as they explain over 70% of the variance observed in the data (see Table 3).

These factors can be interpreted as evaluation (questions 6–13, factor 1), perception of the environment (questions 1–5, factor 2), behaviour (questions 14–16, factor 3), and perception of space (questions 17–18). It can be seen that they almost entirely match those contained in the relevant literature and in the sections of the questionnaire itself [32]. In this case, we find that quality forms part of the behaviour, instead of part of the perception, contradicting the theoretical arguments in this area. Perception also seems divided into environmental perception and the perception of space, something

that some authors have clearly highlighted as an independent factor and of extreme importance in other studies [99]. As the factorial analysis has considered quality to form part of behaviour, a multivariate analysis has been carried out for this factor, after completing the MANCOVA. This multivariate analysis is proposed to individually consider each of the items forming part of this factor (see Table 4). In order to avoid any possible interference by exogenous variables not included in the estimation of the factors, gender and scent are introduced as control variables.

Table 3. Total variance explained.

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
Factor 1: evaluation	9.257	51.425	51.425	4.979	27.661	27.661
Factor 2: perception	1.236	6.869	58.294	3.758	20.879	48.540
Factor 3: intended behaviour	1.159	6.440	64.734	2.498	13.876	62.416
Factor 4: perception of space	1.080	6.002	70.736	1.498	8.320	70.736

Extraction method: principal component analysis.

Table 4. Multivariate Tests.

	Effect	Value	F	Gl of Hypothesis	gl of Error	Sig.
Interception	Traza de Pillai	0.917	620.278b	4.000	224.000	0.000
	Lambda de Wilks	0.083	620.278b	4.000	224.000	0.000
	Traza de Hotelling	11.076	620.278b	4.000	224.000	0.000
	Raíz mayor de Roy	11.076	620.278b	4.000	224.000	0.000
Odor	Traza de Pillai	0.256	19.311b	4.000	224.000	0.000
	Lambda de Wilks	0.744	19.311b	4.000	224.000	0.000
	Traza de Hotelling	0.345	19.311b	4.000	224.000	0.000
	Raíz mayor de Roy	0.345	19.311b	4.000	224.000	0.000
Sex	Traza de Pillai	0.237	7.559	8.000	450.000	0.000
	Lambda de Wilks	0.770	7.818b	8.000	448.000	0.000
	Traza de Hotelling	0.290	8.076	8.000	446.000	0.000
	Raíz mayor de Roy	0.254	14.312c	4.000	225.000	0.000
ODOR * Sex	Traza de Pillai	0.232	7.380	8.000	450.000	0.000
	Lambda de Wilks	0.770	7.835b	8.000	448.000	0.000
	Traza de Hotelling	0.297	8.290	8.000	446.000	0.000
	Raíz mayor de Roy	0.290	16.340c	4.000	225.000	0.000

a. Design: Interception + ODOR + Sex + ODOR * Sex; b. Precise statistic; c. The statistic is an upper limit in F that generates a lower limit in the level of significance.

The results show that scent has a direct influence on the perception of the environment and on the individual's evaluation (see Table 5). Therefore, the presence of scent in the museum makes the individuals who have visited it value it more highly than those who have visited it without the scent, and they evaluate the museum more positively. This result is consistent with those published to date in the literature [46]. Although, the test of equality of covariance matrices was significant, proving the null hypothesis of the observed covariance matrices of the dependent variables being equal across groups.

According to the analysis, we observed that there are differences between the means of the experimental and control groups, that is, that the existence of the odor influences the measured variables.

This confirms hypotheses H1 and H4; nonsignificant values are obtained for the influence on the perception of space and the behaviour of the individual, contrary to that postulated in the literature [32,33,57,84]. However, other authors [62] have reached the same conclusion that scent has no direct influence on spending behaviour, a result that leads to the rejection of our hypotheses H2 and H5.

With regard to the influence of gender, similar results are obtained, with the exception being that there are also significant differences for the perception of space. That is, men and women value the museum differently and their perceptions of the environment and space available are different, as has been demonstrated in other studies [84,92–94,100]. The joint influence of scent and gender continues to be very significant in the case of the evaluation and perception of the environment factors. This implies

that the influence of scent is different depending on the visitor's gender, affecting both genders differently in the aspect of evaluation and perception, as demonstrated in the literature [84,93,95]. This means that hypotheses H1 and H4 also fit when the effect of the gender factor is added.

Table 5. Tests of within-subject effects.

Source	Dependent Variable	Type III Sum of Squares	df	Average Quadratic	F	Sig
Corrected model	Perception of the environment	14.322 **	5	2.864	7.874	0.000
	Individual evaluation	10.706 **	5	2.141	7.031	0.000
	Individual behaviour	1.078 *	5	0.216	0.653	0.660
	Perception of space	5.693 *	5	1.139	2.562	0.028
Interception	Perception of the environment	440.424 **	1	440.424	1210.626	0.000
	Individual evaluation	483.909 **	1	483.909	1588.99	0.000
	Individual behaviour	615.066 **	1	615.066	1863.401	0.000
	Perception of space	555.509 **	1	555.509	1250.135	0.000
SCENT	Perception of the environment	12.555 **	1	12.555	34.512	0.000
	Individual evaluation	9.834 **	1	9.834	32.289	0.000
	Individual behaviour	0.058	1	0.058	0.176	0.676
	Perception of space	0.229	1	0.229	0.515	0.474
Gender	Perception of the environment	5.927 **	2	2.963	8.145	0.000
	Individual evaluation	6.517 **	2	3.258	10.699	0.000
	Individual behaviour	0.250	2	0.125	0.378	0.686
	Perception of space	3.115 *	2	1.557	3.505	0.032
SCENT * Gender (Interception + Odor + Gender)	Perception of the environment	8.186 **	2	4.093	11.251	0.000
	Individual evaluation	7.457 **	2	3.728	12.242	0.000
	Individual behaviour	0.341	2	0.171	0.517	0.597
	Perception of space	0.358	2	0.179	0.403	0.669
Error	Perception of the environment	82.582	227	0.364		
	Individual evaluation	69.134	227	0.305		
	Individual behaviour	74.928	227	0.330		
	Perception of space	100.870	227	0.444		

* significance level 95%. ** significance level 99%.

With regard to behaviour, the analysis of means rejects hypothesis H5, contrary to what some authors postulate [3].

Finally, due to the composition of factor 3, behaviour, the MANCOVA analysis has been replicated for each item in this factor.

The analysis demonstrates a clear influence of scent on the intention to revisit, and only gender is not significant in this case. Thus, hypothesis H6 of an improved intention to revisit is accepted, but only with the influence of scent, as the influence of gender is irrelevant. These results are consistent with the literature [32,33,57,84].

In terms of quality, scent has no significant influence on the perception of this, so H3 is rejected (see Table 6), contrary to that largely postulated in the literature [1–4]. However, this is in line with other studies suggesting that scent does not influence the perception of quality directly, but rather through evaluations and improved well-being [62].

Scent also has no influence on selecting a museum, that is, scent does not have an influence on the intention to choose this museum over others of the same theme and category, contrary to what has been stated on the matter so far in the literature [52,88].

Table 6. Tests of within-subject effects for the selection, revisit, and quality items.

Source	Dependent Variable	Type III Sum of Squares	Average Quadratic
Corrected model	Selection	1.297	0.259
	Revisit museum	8.332	1.666
	Quality	1.859	0.372
Interception	Selection	636.257 **	636.257
	Revisit museum	530.529 **	530.529
	Quality	624.033 **	624.033
Gender	Selection	0.784	0.392
	Revisit museum	1.796	0.898
	Quality	0.152	0.076
SCENT	Selection	0.045	0.045
	Revisit museum	4.474 **	4.474
	Quality	0.090	0.090
Gender * SCENT	Selection	0.612	0.306
	Revisit museum	1.839	0.919
	Quality	1.220	0.610
Error	Selection	114.856	0.504
	Revisit museum	139.445	0.612
	Quality	110.367	0.484
Total	Selection	4936.000	
	Revisit museum	4770.000	
	Quality	4923.000	
Total corrected	Selection	116.154	
	Revisit museum	147.778	
	Quality	112.226	

* significance level 95%. ** significance level 99%.

5. Conclusions

This study makes a series of interesting contributions, both theoretical and practical.

From a theoretical viewpoint, it fills part of the gap in the application of olfactory marketing to nonprofit environments. Until now, such studies have been scarce and have never been applied to an actual museum, except in the case of Cirrincione [4], who applied it to an art gallery. The results show that the assumptions that scent increases the desire to revisit an environment or establishment are corroborated, though they do contradict the questions relating to the influence on the other variables of behaviour and perception of space.

In relation to the hypotheses raised, with hypothesis 1, the importance of the presence of a smell is confirmed, since it leads to a better perception for visitors to a museum compared to a scenario without smells. Hypothesis 2 is rejected, since it is not shown that the presence of a smell increases the perception of space and reduces the number of people perceived as present. Hypothesis 3 is also rejected as there is no evidence that the presence of a smell causes a better perceived quality among museum visitors. The assumption of hypothesis 4 is confirmed because the environmental evaluation carried out by the museum visitors is greater in those cases in which the room is scented. The presence of a smell does not lead to a better expected behavior; therefore, hypothesis 5 is rejected; however, the presence of an aroma increases the intention of visitors to visit a museum again, so hypothesis 6 is confirmed.

This experiment also contributes to increasing the literature on olfactory marketing, especially in its lesser-studied fields such as nonprofit environments. For this, both the techniques and the tools used in commercial areas have been used.

From a practical viewpoint, this research makes important contributions to management. Firstly, it demonstrates the influence of scent on the evaluations of artistic services. For this reason, the managers

of art-related institutions should take this aspect of the environment into consideration if they want to differentiate their offer and enhance the museum's image. As far as marketing managers are concerned, olfactory marketing has proven once again to be influential on the evaluations of customers, generically understood as the recipients of a good or service, improving their experience and giving them a greater desire to return than found when scent is not used. Thirdly, it should be noted that this result can be extended to any other nonprofit environment or service, as the items evaluated are common. Thus, it is of particular interest that the proven effect of scent on commercial environments can also occur in noncommercial environments.

Finally, a direct influence of scent on the intention to revisit is demonstrated, thus confirming that postulated in the literature. In the case of commercial environments, this effect implies the intention to return to the shopping centre or to rebuy that product, whereas, in the nonprofit case this effect translates into a greater intention to revisit the museum. This leads to an improvement in revenue due to increased visits, as well as to greater 'loyalty' among the visitors, who repeat their visit.

In conclusion, the main results of this experiment show that olfactory cues are really relevant for a museum's image and for visitors' evaluations and behaviour, especially in revisiting intention and experience.

The main limitations of this study are those related to the sample and the scope of this study. Firstly, the sample size and number of museums in which this experiment has been conducted must be increased, in order to demonstrate whether these effects are maintained. Secondly, it is necessary to progress in analysing this data to demonstrate the relationships between the variables. That is, a second analysis should reveal the relationships between the variables and their directions, as it could be that behaviour or perception of space are not influenced directly by scent, but rather indirectly through the improvement seen in the other two variables. Thirdly, it is necessary to investigate why some variables are not directly influenced by scent. That is, it would be useful to observe whether the lack of influence on selection or other items is determined by the very nature of the scent, or whether it is due to the weight of other variables over the olfactory one.

The analysis carried out allows us to outline future developments that will extend on and look in more depth at the aspects that influence perception and the behaviour of individuals in the environment of noncommercial spaces.

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Appendix A

Table A1. Questionnaire with items.

1. The ambient of this room is	Negative (1)	2	3	4	Positive (5)
2. The ambient of this room is	Unattractive (1)	2	3	4	Attractive (5)
3. The ambient of this room is	Tensed (1)	2	3	4	Relaxed(5)
4. The ambient of this room is	Uncomfortable (1)	2	3	4	Comfortable (5)
5. The ambient of this room is	Bad(1)	2	3	4	Good (5)
6. The ambient of this room is	Boring (1)	2	3	4	Stimulating (5)
7. The ambient of this room is	Unlively (1)	2	3	4	Lively (5)

Table A1. *Cont.*

8. The ambient of this room is	Dull (1)	2	3	4	Bright (5)
9. The ambient of this room is	Unmotivating (1)	2	3	4	Motivating (5)
10. The ambient of this room is	Uninteresting (1)	2	3	4	Interesting (5)
11. The ambient of this room is	Unpleasant (1)	2	3	4	Pleasant (5)
12. The appearance of this room is	Bad (1)	2	3	4	Good (5)
13. Comparing with others rooms in this museum, this room is	Worse (1)	2	3	4	Better (5)
14. The selection of the exposed pieces of this room is	Inadequate (1)	2	3	4	Adequate (5)
15. Reproduction if the room is	Unrealistic (1)	2	3	4	Very realistic (5)
16. The quality of the pieces is	Low (1)	2	3	4	High (5)
17. Would you recommend this room to your family and friends?	Absolutely no (1)	2	3	4	Absolutely yes (5)
18. Would you visit this room again?	Absolutely no (1)	2	3	4	Absolutely yes (5)
19. The crowd while you have been visiting this room was	Too much (1)	2	3	4	Too many (5)
20. The space available to observe the rooms reproduced was	Few (1)	2	3	4	Much (5)

Table A2. Rotated component matrix.

	Component			
	Factor 1: Evaluation	Factor 2: Perception	Factor 3: Intended Behaviour	Factor 4: Perception of Space
Motivation	0.801			
Suitability	0.760			
Stimulation	0.745			
Colourful	0.732			
General environment	0.724			
Comparison	0.680			
Pleasantness	0.640			
Sense of openness	0.623			
Overall evaluation		0.817		
Attraction		0.780		
Happiness		0.722		
Relaxation		0.682		
Convenience		0.581		
Selection			0.798	
Quality			0.765	
Revisit museum			0.673	
No. of people perceived				0.852
Space perceived				0.727

Extraction method: principal component analysis. Rotation method: Varimax with Kaiser standardisation. The rotation converged in 5 iterations.

Table A3. Hypotheses results.

Hypotheses	Results
H1: The presence of a scent leads to an improved general perception among visitors to a museum, with regard to its exhibitions, compared to a scenario without the presence of scent.	Confirmed
H2: The presence of a scent increases the perception of space and reduces the number of people perceived to be present.	Rejected

Table A3. Cont.

Hypotheses	Results
H3: The presence of a scent leads to improved perceived quality among visitors to a museum, with regard to its exhibitions, compared to a scenario without the presence of scent.	Rejected
H4: The ambient evaluation carried out by the museum's visitors is greater in those cases where the room is scented.	Confirmed
H5: The presence of a scent leads to improved intended behaviour	Rejected
H6: The presence of a scent increases the intention of visitors to revisit a museum	Confirmed

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