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## Article

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European Research on Management and Business Economics (ERMBE)

## Provided in Cooperation with:

European Academy of Management and Business Economics (AEDEM), Vigo (Pontevedra)

*Suggested Citation:* Ortegón-Cortázar, Leonardo; Royo-Vela, Marcelo (2019) : Nature in malls: Effects of a natural environment on the cognitive image, emotional response, and behaviors of visitors, European Research on Management and Business Economics (ERMBE), ISSN 2444-8834, Elsevier, Amsterdam, Vol. 25, Iss. 1, pp. 38-47, <https://doi.org/10.1016/j.iedeen.2018.08.001>

This Version is available at:

<https://hdl.handle.net/10419/205771>

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## Nature in malls: Effects of a natural environment on the cognitive image, emotional response, and behaviors of visitors

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### ARTICLE INFO

#### Article history:

Received 28 February 2018

Received in revised form 23 July 2018

Accepted 2 August 2018

Available online 6 September 2018

#### JEL classification:

M3

M20

#### Keywords:

Natural atmosphere

Cognitive image

Affective response

Behavioural intentions

Shopping malls

Multiple measurement analysis

### ABSTRACT

This study aims to assess the role of a natural environment and its effects on the following components of attitudes: cognitive image, affective response, and behavioral intentions. Using a survey conducted among 292 mall visitors, this study also examines how the perception of the atmosphere in a mall can indirectly affect behavioral intentions. The findings confirm that the components of cognitive image, namely, appealingly design features, may positively influence affective responses at malls. Affective response also positively impacts the behavioral intention of a mall visitor. Affective response features were found to be more powerful than the cognitive image and natural atmosphere attributes to affect the behavioral intentions of visitors through a multiple measurement analysis. In addition, different theoretical and practical implications are discussed.

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### 1. Introduction

The study of environmental variables is a matter of concern in shopping mall management because this improves the power of attraction of these groups of retail stores (Calvo-Porrá & Lévy-Mangín, 2018; Gomes & Paula, 2017; Merrilees, Miller, & Shao, 2016), mainly when providing favorable cognitive, affective, and behavioral experiences (Enales, 2013; Palacios, Pérez, & Polo, 2016).

Several studies have suggested the positive effects of a commercial environment on various behavioral measures of visitors, such as affective responses (Andreu, Bigné, Chumpitaz, & Swaen, 2006; Chebat & Michon, 2003; Das & Varshneya, 2017); the mall's cognitive image (Chebat, Sirgy, & Grzeskowiak, 2010; Mohammad Shafiee & Es-Haghi et al., 2017; Ortegón-Cortázar & Royo Vela, 2015); and customers' behavioral intention measures (El-Adly & Eid, 2016; Lin & Chiang, 2010; Prashar, Singh, Parsad, & Vijay, 2017; Sabrina, 2014). Nevertheless, commercial environment based on natural stimuli has been scarcely researched in these formats although literature considers the need to conduct more empirical

studies in order to demonstrate its influence (Bregman, Willems, & Joye, 2012; Dover, 2015; Söderlund & Newman, 2015; Tifferet & Vilnai-Yavetz, 2017).

Similarly, the study of a natural environment in commercial and service-related premises has recently shown positive effects on the psychological states of consumers (Purani & Kumar, 2018), including mall environments through visual simulations of atmospheres using natural stimuli (Rosenbaum, Ramirez, & Camino, 2018), keeping the conceptual frameworks in the service restoration field (Rosenbaum, Otalora, & Ramírez, 2016) or comparisons with other factors of attraction (Ortegón-Cortázar & Royo-Vela, 2017) that justify their existence. However, none of these studies have considered assessing or documenting the effects on cognitive, affective, and behavioral responses in a comparative and inclusive way.

We argue that the perception of a natural environment is expected to result in cognitive, emotional, and behavioral responses among mall visitors. Therefore, it can be assumed that these relationships should have a positive influence. In this regard, the present research has a two-fold objective: first, to assess the existence of positive effects among these factors on the basis of the consideration of this type of environmental variable inspired by nature, and second, to evaluate the mediation of the cognitive image and affective responses in a nature-based environment and the visitor's behavioral intention.

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As a consequence, the most important contribution to the literature on consumer experience and attraction to shopping malls focuses on considering the perception of the natural environment variable, specifically when analyzing the effects on the three components of consumer attitudes (cognition, affect, and conation). This way, although numerous factors contribute to the environment and its effect on emotions, cognition, or behavioral intention, there is a theoretical gap explaining the effects of the natural environment variable at malls. Therefore, this work expands the state of literature in order to understand its implications on visitor experience (Gilboa, Vilnai-Yavetz, & Chebat, 2016).

To fulfill these aims, the paper is structured into seven sections. The first section discusses the literature reviewed, beginning with the contextualization of the affective and cognitive experience in the context of attraction to malls. In the second section, the notion of the environment as an attraction component was reviewed to incorporate its virtues to the components of attitudes and the development of hypotheses. Further, in the third section, a methodology based on structural equation modeling is proposed. Next, in the fourth section, results of the empirical analysis are shown. The fifth, sixth, and seventh sections include the discussion of the results achieved, limitations, and the implications for management derived from the study, respectively.

## 2. Literature review

Palacios et al. (2016) have stated that the characteristics of malls may result in cognitive and affective responses which, at the same time, may explain visitor behavior. They point out that the mall atmosphere, the accessibility, the physical design, the combination of stores, and the perceptions of overcrowding are factors that impact consumer behavior, resulting in subsequent approaching or avoidance behaviors, where the setting of the environment (for example, during some seasons throughout the year) leads to significant differences in the mall's attraction ability.

For their part, Calvo-Porrá and Lévy-Mangín (2018) consider that in spite of the existence of a wide range of attraction factors to visit a shopping mall, such as convenience, store variety, indoor environment, entertainment, and communication activities, they suggest that the most suitable combination is the management of environmental features and store variety. In this regard, Gomes and Paula's systematic review (2017) has confirmed that there is no consensus concerning the number of factors that compose attraction because the variables that constitute it are multiple and may refer both to tangible and intangible aspects, also related by the geographical and cultural nature of each study (Micu, 2013).

Kim, Lee, and Suh (2015) agree that the attraction factors must provide memorable experiences to favor the behavioral intentions of their visitors by creating positive psychological responses (Das & Varshneya, 2017; El Hedhli, Chebat, & Sirgy, 2013). Similarly, when studying the experience at malls, Merrilees et al. (2016) and Gilboa et al. (2016) highlighted the setting of the environment as a special means of commercial attraction.

### 2.1. Natural environment as a factor of attraction

The design and composition of the atmosphere at malls is an element of special interest in the attraction abilities of shopping malls and the experience gained by consumers. The background to the environmental variable search and management process is summed up in the atmospheric concept, representing the intentional control of environmental variables (Gómez & García, 2012). Kotler (1973) defines this task as "an effort to design shopping environments that produce specific emotional effects in purchasers to increase their likelihood of purchasing" (p. 50).

In this context, incorporating nature-inspired environmental elements is characterized by "the imitation and use of patterns, shapes, materials, symbols, and areas representing nature and evoking similar responses" (Söderlund & Newman, 2015, p. 3). Therefore, their conceptual framework belongs to environmental psychology, whose purpose is to understand the complex relationships between people and natural construction (Chen, Zaid, & Nazarali, 2016; Gifford, 2009), providing a promising framework for future studies (Tam, 2013).

### 2.2. Identifying attitudinal components and establishing hypotheses

Taking the seminal works conducted by Fishbein and Ajzen (1975), Bagozzi (1978) and Breckler (1984) as references, the concept of attitude involves cognition (beliefs), affection (feeling), and conation (behavioral intention). According to Bagozzi (1978) and Breckler (1984), cognition represents a consumer's beliefs and knowledge on the object, whereas affection refers to the emotional response (feeling and mood) toward the object. Conation is the term given to behavior intentions and verbal statements as a function of cognition and affection.

Based on the foregoing, our reasoning with respect to natural environment is encompassed in Mehrabian and Russell's stimuli-organism-response (SOR) model (1974), which suggests that stimuli (environmental variables) are linked to behavioral responses (behavioral intentions) through cognitive and emotional responses—in our case, the intermediary variables that cause behavioral intentions of mall visits.

Each variable is described below with its respective hypothesis, classified in accordance with the corresponding relationships and attitudinal interest component.

#### 2.2.1. Nature-based environment

Tifferet and Vilnai-Yavetz (2017) suggested that the natural stimuli in a commercial environment may affect psychological responses of comfort and, to a certain extent, consumer behavior. In this regard, Purani and Kumar (2018) noted the growing interest in researching service environments offering natural settings. They suggested effects on customers' psychological states, attention, and mood, which also positively impact the preference for the service. For their part, Rosenbaum et al. (2018) researched the effects of natural elements in consumers' cognitive and affective responses through video simulations, showing positive effects on such stimuli. In the field of factors of attraction, Ortegón-Cortázar and Royo-Vela (2017) investigated the role of a natural environment, exhibiting its properties as a variable of attraction in behavior, without being able to examine its effects on the mediator attitudinal variables.

Within the framework of a consumer's mental response, Amérigo, García, and Sánchez (2013) bring to light the growing interest in analyzing attitudes toward a natural environment, particularly on overall impressions and the attention span. In return, Berman, Jonides, and Kaplan's study (2018) suggests that the interaction with nature brings great cognitive benefits when comparing natural and urban environments, therefore concluding that the natural settings are better able to increasingly capture attention, either by walking around or looking at pictures, as also documented by Kaplan and Kaplan (1989), who suggest that exposure to nature impacts the restorative capacity of attention.

As we can see, literature has interpreted that the presence of a natural environment leads to cognitive responses through sensory impressions. Thus, it is reasonable to think that the cognitive image of malls will be the result of the perception of a nature-based

environment present in the mall itself. On this basis, the following hypothesis is raised:

- H1a: A natural environment influences the cognitive image of mall customers.

Further, the effects of nature's stimuli on mall visitors' behavior have been established. Buber, Ruso, Gadner, Atzwanger, and Gruber, (2007) observed the behavior of mall visitors through video recordings and found that the presence of artificial plants increased approaching behaviors although they were unable to assess the intentions to return to the same shopping mall. For their part, in the retail sector, Brengman et al. (2012) report the influence of using natural elements on consumers' approaching and avoidance responses, without being able to extrapolate this to groups of stores or shopping malls.

There is also empirical evidence regarding the positive effects of a natural environment on behavioral intention in previous studies such as hotels with eco-friendly surroundings (Kim & Han, 2010), particularly the study conducted by Lee, Hsu, Han, and Kim (2010), who state that areas using a green design attract and retain more guests. It seems reasonable to think that insofar as nature-based stimuli are perceived by consumers, they will develop a behavioral intention to visit malls. Therefore, the following hypothesis is posed:

- H1b: A natural environment influences the behavioral intention of mall customers.

Continuing with Brengman et al. (2012), it has been demonstrated that environments using natural stimuli also have a significant and positive effect on emotional responses in retail-store settings, understanding these responses as affective states experienced by customers (Robles & Páez, 2003). Guéguen and Stefan (2016) confirm the positive influence of a natural environment on various psychological states associated with affective responses, particularly on mood and increased desire to help others. For their part, Mantler and Logan (2015) describe the effects of the environment using stimuli from nature on mental health and psychological state. Similarly, Joye and Bolderdijk (2014) confirm the existence of the effects of natural visual stimuli on emotional responses, oriented toward social value and willingness to donate, from which we can infer that commercial environments that include nature stimuli are able to improve positive psychological states (Joye, Poels, & Willems, 2011). On the basis of these considerations, the following hypothesis is raised:

- H1c: A natural environment influences affective responses of mall customers

### 2.2.2. The mall's cognitive image

According to Palacios et al. (2016), creating pleasant environments at the mall becomes a challenge of effective management of client experience when attempting to gain new customers and retain current customers. In this respect, managing the cognitive response represented in the concept of image has been considered highly interesting due to its proven effect on company sales (Ataman & Ülengin, 2003) and its implications in choosing a specific shopping mall (Ortigón-Cortázar & Royo Vela, 2015). Therefore, a mall's image can be interpreted as the cognitive response based on the beliefs, ideas, or perceptions formed through direct interaction with customer-targeted offers present in the commercial environment and the available goods and services (Fiore & Kim, 2007).

Chebat et al. (2010) express that one way to generate more traffic in a shopping mall entails building a strong cognitive image of the mall, comprising different variables attributed to factors that contribute to general attraction, where the design and arrangement of agreeable elements may lead to a more pleasant and comfortable experience (Baker & Wakefield, 2012).

Fiore and Kim (2007) assessed the influence of a cognitive image on affective responses and behavioral intentions, pointing out the existence of other empirical studies in which the favorable cognitive response precedes emotions while they are prior to customer behavior (Chebat & Michon, 2003). Consequently, both affective responses and behavioral intentions can be considered an effect of a mall's cognitive image. Considering this, the following two hypotheses are proposed:

- H2a: Cognitive image influences the affective responses to a mall.
- H2b: Cognitive image influences the behavioral intention toward a mall.

### 2.2.3. Affective responses of visitors

Research on affective or emotional states in commercial environments has been widely studied in marketing literature, considering it a mediator variable between the environment's perception or cognition and behavior (Fiore & Kim, 2007; Gaur, Herjanto, & Makkar, 2014). Nevertheless, White and Yu (2005) state that much more needs to be studied in this area given its implications and effects on behavioral intentions.

Recently, when studying the role of consumer emotions at malls, Das and Varshneya (2017) noted the mediator role between characteristics of crowds of people, spatial crowding, companions on a visit, and promotional events to predict the effects on the intention to visit and positive word of mouth. They note that the emotional responses positively impact the intention to visit, explaining that positive emotional responses tend to form a positive attitude that encourages customers to visit the mall and disseminate positive comments.

Machleit and Eroglu (2000) also demonstrated the character and influence of emotions on behavior at shopping malls. For example, they state that there is a wide range of emotions in the context of shopping and that responses considerably vary in accordance with the characteristics of the retail environment. Similarly, in a later study, Machleit and Mantel (2001) identified the role of affective responses on behavior, suggesting that emotions more strongly impact shopping satisfaction when feelings are attributed to the store instead of being internally attributed.

Yu and Dean (2001) compare the predictive capacity of the affective and cognitive elements of consumer loyalty, suggesting that affective responses are correlated with behavioral intentions, also being a comparatively better predictor of behavior than cognitive responses. Subsequently, Koo and Ju (2010) also demonstrated that consumers' emotions positively impact their responses. Thus, studies in this field allow us to consider an effect on affective responses to behavioral intentions by means of the following hypothesis:

- H3: Affective responses influence the behavioral intention of mall customers.

Ultimately, the variables implemented in this research are in line with the components of attitudes. Of these, the last component refers to behavioral intentions of visiting a mall. This concept is based on Ajzen's Theory of Planned Behavior (1991), which states that most people's behavior is based on their intentions (Ajzen & Fishbein, 1980). In this regard, this variable expresses people's desire to visit shopping malls, the purpose of commercial attraction



**Table 1**  
Definition of items.

Constructs	Items	Authors
Natural environment	- Natural areas or settings - Presence of rooms with vegetation - Eco-friendly mall design	Ortegón-Cortázar and Royo-Vela (2017); Berman et al. (2008); Lee et al. (2010)
Cognitive image	- Mall's pleasant design and appearance - Mall's appealing image - Perception of a modern design	Park (2016); El-Adly and Eid (2016)
Affective response	- Energy - Enthusiasm - Spirit	Amérigo et al. (2013); Sandín et al. (1999); Watson et al. (1988)
Behavioral intention	- Tendency to visit the mall - To visit it continuously - Enjoyment in visiting the mall	Jang and Namkung (2009); Ryu and Jang (2007); Zeithaml et al. (1996)

Source: Adapted by the author after reviewing the literature.

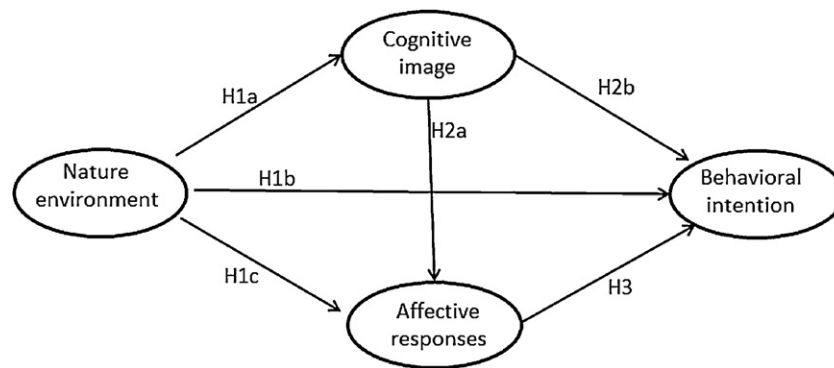


Fig. 1. Conceptual model.

(Bigné & Andreu, 2004; El-Adly & Eid, 2016; Wakefield & Baker, 1998).

In short, Fig. 1 shows the conceptual model proposed.

### 3. Methodology

#### 3.1. Information collection process and sample characteristics

For the purposes of confirming the proposed hypotheses, the shopping mall was chosen as the object of study given its significant growth and consolidation in Latin America (ICSC, 2017). A questionnaire was prepared as a survey tool to measure the relationships between the natural environment, cognitive image, affective response, and customer behavioral intention.

The questionnaire was administered by personally approaching a sample of 305 individuals in 17 well-known shopping malls located in a large Latin American city, all of them with a space larger than 40,000 square meters. Of these, 292 questionnaires were ultimately assessed. The questionnaire asked respondents to answer questions related to the shopping mall during their visit. The sample was made up as follows: 42.4% were aged between 18 and 24 years, 18.2% were aged between 25 and 32 years, 10.6% were aged between 33 and 40 years, 15.1% were aged between 41 and 50 years, and 12% were over 50 years old. Regarding gender, the sample comprised 41.1% men and 58.9% women. In terms of the shopping mall in question, a higher percentage mentioned Chía Center, followed by Salitre Plaza, Andino, Portal 80, Calima, Centro Mayor, Gran Estación, Hayuelos, among others.

#### 3.2. Variable measurement: measurement scales

To validate the measurement scales, a process allowing for checking the compliance of their psychometric properties was

initiated; thus, the acceptance of these scales was based on the achievement of various stages related to the validity, reliability, and unidimensionality. This way, the validity of the content was checked first (Table 1), to continue with the confirmation of dimensionality, reliability, convergent validity, and discriminant validity.

Content validity seeks to ensure the adaptation of the items considered and the concepts to be measured (Lévy Mangin, 2003). Questions arose out of the literature review, adjusting measures to the object of study by a group of experts who were responsible for keeping three indicators for each factor. The perception measures of the natural environment were based on the literature regarding natural environment and eco-friendly measures applied to the mall (for example, Berman et al., 2008; Lee et al., 2010; Ortigón-Cortázar & Royo-Vela, 2017), whereas measures for affective response were based on indicators of the Positive and Negative Affect Schedule scale (Amérigo et al., 2013; Sandín et al., 1999; Watson, Clark, & Tellegen, 1988), removing items from the original scale and favoring positive emotional states (such as energy, enthusiasm, and spirit). Cognitive image was measured in terms of the framework proposed regarding a mall's attractive design and pleasant appearance (for example, El-Adly & Eid, 2016; Park, 2016). The measures for behavioral intention were adapted at the discretion of the group of experts on the basis of the questions used by Jang and Namkung (2009) and Zeithaml, Berry, and Parasuraman (1996). Focused on returning to the same shopping mall in the future.

An exploratory factor analysis was carried out to identify the dimensionality of scales, followed by a confirmatory factor analysis (CFA). This process is documented below, including the empirical validation of the structural model.

### 4. Results

The empirical contrast of the hypotheses was based on Anderson and Gerbin's hypothesis (1988), who suggested that they should

**Table 2**  
Descriptive analysis of the items.

Items	Standardized factorial loads	Cronbach's alpha if the item was removed	Asymmetry	Kurtosis	
<b>Natural environment (CA = .93; composite reliability (CR) = .918; average variance extracted (AVE) = .789)</b>					
ECO1	Natural areas or settings	.977	.861	–.132	–.961
ECO2	Presence of rooms with vegetation	.856	.915	–.139	–.932
ECO3	Eco-friendly mall design	.825	.928	–.080	–.910
<b>Affective response (CA = .93; CR = .845; AVE = .645)</b>					
AFF1	Energy	.815	.91	–.320	–.506
AFF2	Enthusiasm	.803	.889	–.283	–.377
AFF3	Spirit	.791	.898	–.432	–.158
<b>Cognitive image (CA = .89; CR = .863; AVE = .681)</b>					
COG1	Mall's pleasant design and appearance	.947	.785	–1.050	.661
COG2	Mall's appealing image	.815	.842	–1.038	.880
COG3	Perception of a modern design	.695	.917	–.517	–.497
<b>Behavioral intention (CA = .912; CR = .82; AVE = .604)</b>					
CVIS1	To visit it continuously	.863	.896	–.267	–.695
CVIS2	Tendency to visit the mall	.746	.84	–.432	–.328
CVIS3	Enjoyment in visiting the mall	.716	.88	–.399	–.523

Source: Prepared by the author.

be carried out in two separate steps. First, the measurement scales are validated through a CFA. Second, we proceed to estimate the structural model and the proposed hypotheses. In this respect, a CFA was conducted using SPSS v22 for the purpose of identifying the underlying structure of the measurement instrument factors. To detect whether the items accurately measured each factor, all the dependent and independent variables were included in the factor analysis for each factor to be disclosed separately.

#### 4.1. Validity of the measurement scales

As regards the CFA, Bartlett's sphericity test was significant ( $\chi^2 = 3,025,528$ ,  $gl = 66$ ,  $p < 0.001$ ). Kaiser–Meyer–Olkin's measure of a sampling adequacy of 0.855 exceeded the minimum baseline of 0.50 proposed by Kaiser (1974). The CFA, through the maximum likelihood estimation method, identified four vectors with values higher than 1.0 that explained the 80.17% of the variance, which exceeds the 45% limit advised by Netemeyer, Bearden, and Sharma (2003). The solution resulting from applying a Varimax rotation was interpreted, and highly significant factorial loads ( $p < 0.001$ ) and those exceeding 0.71 were identified, as observed in Table 2. The natural environment factor (21.28%) is formed by three items with the highest loads. The affective response factor (20.13%) comprises three items with acceptable loads. The cognitive image factor (19.84%) is formed by three variables with high factorial loads in the rotated factor matrix. Finally, the behavioral intention factor (18.9%) is made up of three variables.

Cronbach's alpha (CA) (Nunnally & Bernstein, 1978), Cronbach's alpha without the item, the composed reliability index (Werts, Linn, & Jöreskog, 1974), and the average variance extracted (AVE) (Fornell & Larcker, 1981) were calculated for the validity and reliability analysis, with which the internal consistency and proportion of variance explained were identified by reflective constructs. As regards the composite reliability (CR), values of around 0.6 are acceptable (Bagozzi & Yi, 1988). Hair, Ringle, and Sarstedt (2012) suggest that assessing both criteria, CA and CR, is a good practice. As it can be observed, all latent variables exceeded the minimum limits of CA = 0.7 and CR = 0.60. These authors also suggest a minimum baseline of 0.5 for the AVE as a measurement for the convergent validity among reflective constructs.

To assess discriminant validity, the comparison method between shared variance (squared correlations) and extracted variance (Fornell & Larcker, 1981) was chosen, constructing a comparative matrix (see Table 3), where it could be observed that no

**Table 3**  
Comparison between shared variance and extracted variance to assess discriminant validity.

	ECO	AFF	COG	CVIS
ECO – natural environment	0.789			
AFF – affective response	0.116	0.645		
COG – cognitive image	0.065	0.233	0.681	
CVIS – behavioral intention	0.112	0.531	0.260	0.604

Source: Prepared by the author.

**Table 4**  
Estimators and their significance for exogenous latent variables from those observed.

Relationship	Estimate	Standard error (S.E.)	C.R.	p
COG1 ← Cognitive image	1			
COG2 ← Cognitive image	0.914	0.041	22.381	0.001*
COG3 ← Cognitive image	0.839	0.05	16.857	0.001*
ECO1 ← Natural environment	1			
ECO2 ← Natural environment	0.885	0.034	26.185	0.001*
ECO3 ← Natural environment	0.867	0.035	24.457	0.001*
CVIS3 ← Behavioral intention	1			
CVIS2 ← Behavioral intention	0.914	0.048	19.164	0.001*
CVIS1 ← Behavioral intention	1.055	0.047	22.323	0.001*
AFF1 ← Affective response	1			
AFF2 ← Affective response	1.012	0.044	22.908	0.001*
AFF3 ← Affective response	0.998	0.045	22.383	0.001*

Source: Prepared by the author.

\* The asterisk means that the error acceptance corresponds to the following value  $p < 0.001$ .

construct pair is lower than the extracted variance for each individual construct, thus confirming the existence of discriminant validity.

Subsequently, to validate the measurement indicator, the relationships between exogenous variables and their constructs were calculated (see Table 4). This way, the non-standardized estimators of the relationships of the variables to the right can be observed compared to the variables to the left.

#### 4.2. Structural relationship model: hypothesis contrasting

A traditional approach of structural equations for a reflective measurement model (Bollen, 1989) was adopted for model

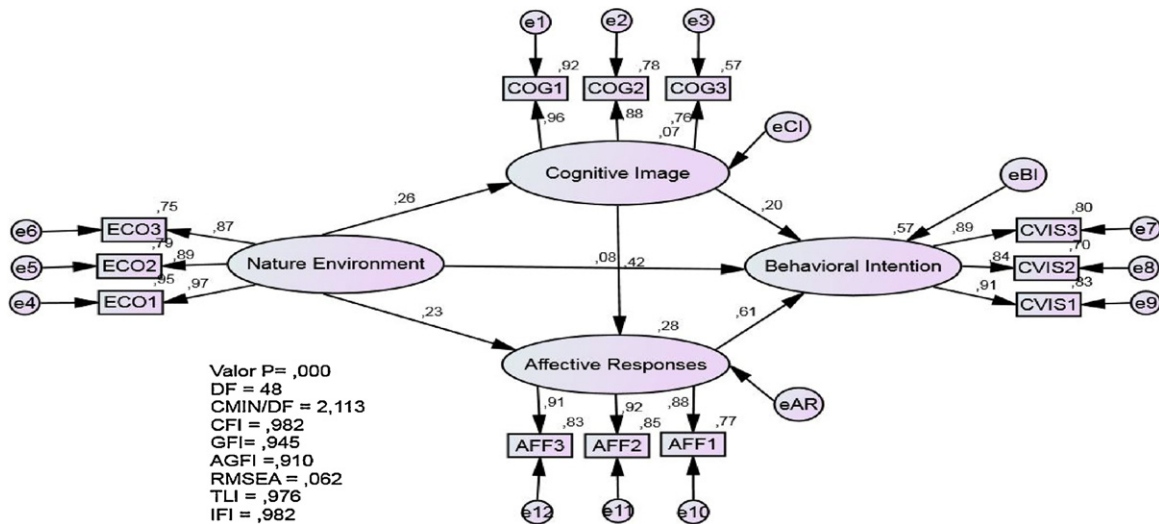


Fig. 2. Estimation of the proposed model.

adequacy, following and implementing the steps described in the literature (Hair et al., 2012).

The assessment and construction of the structural model was conducted through AMOS V24.0 software using ordinal variables (Bollen, 1989; Pérez, Medrano, & Sánchez Rosas, 2013), whose data distribution suggests univariate normality (George & Mallery, 2001) based on 292 cases. For the purposes of assessing model adequacy, it is proposed that the Chi-square ratio on the degrees of freedom (CMIN/DF), the comparative fitness index, the goodness of fit index (GFI), and the adjusted goodness of fit index (AGFI) be used. With regard to residuals, the root mean square error of approximation (RMSEA) is posed, as represented in Fig. 2.

To calculate the goodness indicators of the structural model adjustment, a maximum likelihood method was implemented, obtaining the following values for the most common indicators (Escobedo, Hernández, Estebané Ortega, & Martínez Moreno, 2016). CMIND/GL = 2.113, Schumacker and Lomax (2004) suggest acceptable values lower than 3. GFI = 0.945; and AGFI = 0.91. Browne and Cudeck (1989) suggest acceptable values of over 0.90. The RMSEA indicator = 0.062, which represents the mean square root, where a value lower than 0.08 (Browne & Cudeck, 1989), and preferably less than 0.05 (Steiger, 1990), is considered acceptable. Alternatively, RMSEA's higher confidence interval should not exceed 0.08 (Hu & Bentler, 1999). In this case, the interval found is between 0.045 and 0.079. Finally, the Tucker Lewis index indicators (the Non-Normed Fit) = 0.978 and eIFI = 0.982 were higher than the suggested values of 0.90 (Escobedo et al., 2016). Consequently, the values obtained for the GFI indicators allow us to interpret an acceptable structural model.

As regards the estimate of the parameters of the latent variables in the structural model, the relationships between the different exogenous and endogenous variables with their respective standard error (S.E), the standardized estimate (C.R.), and its p-value can be observed in Table 5.

Table 5 shows that the behavioral intention component is significantly affected by the cognitive image and affective response latent variables, whereas the natural environment's latent variable ( $p < 0.1$ ) does not significantly affect the behavioral intention variable by directly interpreting the demonstration of hypotheses H1a and H1c and has no sufficient evidence to accept H1b. However, the empirical evidence suggests other types of positive and significant relationships between other attitudinal components that depend on a natural environment. This way, cognitive image favors affective response (H2a) and behavioral intentions to visit (H2b) in a

Table 5

Estimators and their significance for the endogenous and exogenous latent variables.

Relationship	Estimate	S.E.	C.R.	p
Cognitive image ← Natural environment	0.2	0.047	4.247	0.001
Affective response ← Natural environment	0.172	0.041	4.16	0.001
Affective response ← Cognitive image	0.397	0.055	7.243	0.001
Behavioral intention ← Natural environment	0.061	0.038	1.614	0.106
Behavioral intention ← Affective response	0.65	0.064	10.191	0.001
Behavioral intention ← Cognitive image	0.198	0.053	3.716	0.001

Source: Prepared by the author.

Table 6

Overall (O), direct (D) and indirect (I) effects of the model's latent variables.

Model variables	2	3	4
(1) Natural environment	O = .255 D = .255 I = .000	O = .342 D = .234 I = .108	O = .335 D = .077 I = .258
(2) Cognitive image		O = .423 D = .423 I = .000	O = .454 D = .197 I = .257
(3) Affective response			O = .608 D = .608 I = .000
(4) Behavioral intention			

Source: Prepared by the author on the basis of Pérez et al.'s study (2013, p. 61).

considerable and direct way. Similarly, the results suggest that the behavioral intention of the visit is directly and significantly influenced by a mall's affective response, therefore accepting hypothesis 3.

#### 4.3. Overall direct and indirect effects of the structural model

Once the direct effects are checked, the indirect (mediator) and overall effects between the variables composing the structural model were assessed. To that end, in view of the convenience of the structural analysis in AMOS and following the procedure described by Pérez et al. (2013, p. 61) to identify the indirect and overall effects of latent variables, a decomposition matrix of the standardized effects of components of attitudes toward the natural environment variable was created (see Table 6).

The analysis of the indirect effects of a natural environment on behavioral intentions shows an overall effect (O) of 0.335 and

an indirect effect (I) of 0.258, thus indicating significant mediator effects. In other words, a natural environment has a positive impact on behavioral intentions both global/overall and mediated by the cognitive image and the affective responses, respectively. Similarly, the analysis of indirect effects reveals that the cognitive image directly influences behavioral intention by 0.197 although the indirect effect is higher through affective responses, whit 0.257.

When comparing the structural model with direct effects with the structural model with indirect effects (mediation), Murgui and Jiménez (2013) stated that a very common procedure in SEM is the one carried out by Holmbeck (1997). First, the adjustment of the full model containing mediation relationships (M) is checked. Then, the adjustment is compared with a restricted model (excluding indirect relationships). If the model adjustment is better when including direct paths, the non-restricted full model is chosen. In our case, the full model indicators ( $X \rightarrow M \rightarrow Y$ ) are better adapted than the restricted model indicators ( $X \rightarrow Y$ ), recognizing that this procedure to examine whether the mediator effects are significant will require both models to show good adjustment in the various indexes that are used in these analyses.

After checking that the model with intervention is the most adjusted, a more specific test needed to be conducted on the model because there is a multiple intervention (cognitive image path or affective response path). As a consequence, we considered applying the PROCESS macro described by Preacher and Hayes (2008) and Hayes (2013), which allows us to assess the relevance of each intermediary in terms of direct and indirect effects. The conditional indirect effects were calculated using 10,000 bootstrapping samples, generating bias-corrected bootstrap confidence intervals (see Appendix).

Continuing with Hayes (2013), first, the analysis of direct effects revealed that a natural environment is positively and significantly related to the cognitive image  $X \rightarrow M1$  ( $B = .20$ ,  $SE = .045$ ,  $p < 0.0001$ ). At the same time, the cognitive image is positively and significantly associated with the affective response  $M1$ ,  $X \rightarrow M2$  ( $BM1 = .413$ ,  $p < 0.0001$ ) including the conditional effect of a natural environment ( $BX = .200$ ,  $p < 0.0001$ ). When examining the effects on the behavioral intention dependent variable by cognitive image  $M1$ , the affective response  $M2$ , and the natural environment  $X$ , positive effects were observed in all cases in the analysis of  $M1$ ,  $M2$ ,  $X \rightarrow Y$  (for example,  $BM1 = 0.227$ ,  $p < 0.0001$ ;  $BM2 = 0.570$ ,  $p < 0.0001$ ; and  $BX = 0.078$ ,  $p < 0.0448$ ), which indicates that both mediators have a greater, significant, and positive impact than a natural environment. Finally, as regards the total effect model  $X \rightarrow Y$ , the analysis results confirm that the behavioral intention to visit is a direct effect of the natural environment ( $BX = 0.285$ ,  $p < 0.0001$ ).

Second, when examining the indirect effects, the construction of mediation hypotheses was required in such a way that indirect effects were specified and contrasted through the mediators (i.e.,  $H1 = \text{Natural environment} \rightarrow \text{Intention of visit} = C'$ ;  $H2 = \text{Natural environment} \rightarrow \text{Cognitive image} \rightarrow \text{Intention of visit} = a1b1$ ;  $H3 = \text{Natural environment} \rightarrow \text{Affective response} \rightarrow \text{Intention of visit} = a2b2$ ;  $H4 = \text{Natural environment} \rightarrow \text{Cognitive image} \rightarrow \text{Affective response} \rightarrow \text{Intention of visit} = a1a3b2$ ), organizing the results in Table 7, based on Castro and Roldán's study (2013).

Table 7 shows that the overall indirect effect through both mediator variables (cognitive image and affective response) is significant, with a value of 0.2071, thus being the case of a partial mediator effect because the direct effect of the independent variable (i.e., the natural environment) in the dependent variable (i.e., intention of visit) is significant as it has no zero value at the interval (0.1424; 0.2803). In addition, data show that the specific mediator effect of the affective response (0.114) is higher than the specific mediator effect of the cognitive image (0.045).

For its part, the contrast of the specific indirect effects (C1, C2, C3 (Hayes, 2013)) shows differences in the importance of the mediator effects. Both paths C2 and C3 showed significant differences compared with the specific indirect effect of path C1 because zero is not within the confidence intervals of both the paths, in contrast with path C1. Finally, when comparing the mediators (C2–C3 contrast), the path with two successive mediators (H4) and the path mediated only by the affective responses (H3) showed values equivalent to the same indirect effect coefficient (–0.6). This finding allows us to assume that the mediation of the affective response variable becomes more important than the specific mediation of the cognitive image variable compared with a natural environment.

## 5. Conclusions

Today, if we visit a shopping mall in any city of the world, we are quickly captivated by the design, architecture, and arrangement of elements in the environment, where its configuration has been shown to have a significant effect on customer behavior (De Farias, Aguiar, & Melo, 2014; Michon, Chebat, & Turley, 2005). This way, creating and developing a distinct and unique atmosphere in a mall may result in greater value for customers, optimizing visitor experience.

Along these lines, the marketing literature has suggested that visitor experience is associated with commercial attraction factors (Gilboa et al., 2016; Merrilees et al., 2016). For example, in the field of attitudinal components analyzed during this study, Palacios et al. (2016) suggested that a mall's atmosphere, accessibility, physical design, range of stores, and perceptions of crowds are responsible

**Table 7**  
Summary of the mediator effect tests.

Total effect of ECO on CVIS(c)		Direct effect of ECO on CVIS		Indirect effects of ECO on CVIS				
Coefficient	t value	Coefficient	t value	Via	Point estimate	Percentile bootstrap 95% confidence interval		
						Lower	Upper	
0.2853**	5.9848	H1 = c'	0.0783*	2.0151	Total	0.2071	0.1424	0.2803
					H2 = a1b1 (via COG)	0.0456	0.0193	0.0847
					H3 = a2b2 (via AFF)	0.1143	0.0655	0.1755
					H4 = a1a3b2 (via COG + AFF)	0.0472	0.0244	0.0794
				Contrast	C1 = a1b1 (via COG)	–.0016	–.0344	.0321
					C2 = a1a3b2 (via AFF)	–.0688	–.1419	–.0043
					C3 = a2b2 (via COG + AFF)	–.0671	–.1328	–.0067

ECO, natural environment; COG, cognitive image; AFF, affective response; CVIS, intention of visit.

\*  $p < 0.05$ .

\*\*  $p < 0.001$ .



for the experience gained, with no combination of factors capable of ensuring a markedly favorable experience.

Due to the above, although marketing literature has focused on the analysis of attraction ability and image at malls (Gomes & Paula, 2017), consideration of and care for the environmental design is under continuous development (Park, 2016). In this regard, the findings of our research suggest that visitor experience may improve by using natural environments, considering it as the main contribution to the literature on the environment and its effect on shaping attitudes: emotions, cognition, and behavior.

Further, our results improve the understanding of the direct and indirect effects of a natural environment in these modern retail stores although this is a topic of growing interest in literature with research in simulated settings, for example, psychological states when looking at photographic images of natural surroundings (Purani & Kumar, 2018), attention processes when watching videos including nature stimuli (Rosenbaum et al., 2018), measurements in the quality perceived in pictures of service environments that include nature stimuli (Tifferet & Vilnai-Yavetz, 2017) or even other applications to real environments such as retail stores (Bregman et al., 2012), without expanding to large-sized groups of stores such as shopping malls. As a result, this research entails a degree of progress and contribution to the state of knowledge on natural environments while they allow verifying measurement factors in a field that has been of great interest for the literature.

The results show that the presence of a natural environment positively and significantly affects the components of attitudes, supported by the conceptual perspective of the SOR classic paradigm developed by Mehrabian and Russell (1974). This conceptual framework has been used in several studies on consumer behavior at malls. For example, Palacios et al. (2016) state that the cognitive and affective responses help to develop approaching or avoidance behaviors toward a mall; Baker and Wakefield (2012) examined the crowding effects on motivational states of control and intimacy and, at the same time, on their purchasing behaviors; and Michon et al. (2005) explained that the atmosphere has an indirect effect on cognition and behavior through mood.

In particular, the results indicate that a natural environment has a direct and positive effect on a mall's cognitive image which, and, at the same time, directly reinforces a visitor's affective response and behavioral intention, as regards the existence of a cognitive image as an environmental effect. Moreover, given the affective and behavioral response through the interpretation of its role as a mediator variable, in this line, the successive-mediation analysis conducted supports this result as well.

At the same time, this cognitive image influences the creation of affective responses, which also impact behavioral intentions. In this context, the results indicate the presence of a mediator effect of affective responses among cognitive image and behavioral intention, confirming the study conducted by Fiore and Kim (2007), in which they observe that environmental stimuli caused cognitive reactions that subsequently generated emotional responses and, afterwards, behavioral responses. These conclusions have also been recently considered in the context of malls on the basis of the study on consumer experience (Palacios et al., 2016).

Likewise, this study could demonstrate the positive effect of a natural environment on the affective responses and also the effect of affective responses on behavioral intention, acknowledging a mediator effect of emotions through the successive-mediation analysis (Hayes, 2013) as the most important mediation path compared with the cognitive image's role. In other words, the influence of nature on customer behavior is because nature generates a series of positive moods, which ultimately influences visitor behavior rather than creating a better cognitive image of the mall, by comparison.

On the other hand, our findings involve a consideration of the hypotheses concerning the existence of a direct, positive, and significant relationship of a natural environment over behavioral intention once again because the analysis showed that it had indirect effects rather than direct effects, as had been proposed in the beginning. This result allows the interpretation that the presence of natural elements at malls only has an effect on the behavioral intentions by shaping a cognitive image and creating emotional responses geared toward psychological well-being in accordance with Joye's findings (2007). In this regard, although literature has studied the role of a natural environment, suggesting that human beings are more favorably inclined to be attracted to it, including artificial natural settings (Söderlund & Newman, 2015), considerations of its direct and indirect effects at malls cannot be found in the consulted literature. In our opinion, this issue is another contribution of our research that should be further analyzed in future studies.

### 5.1. Implications for management

Our results allow us to understand how a natural environment influences the attitudinal components of mall visitors. In practice, our findings suggest that mall developers should optimize their customer experience by incorporating natural elements such as plants, trees, gardens, water fountains, and green areas. This way, the creation of more favorable or positive cognitive and affective responses can be facilitated while inducing behavioral intentions to visit, thus improving a mall's competitiveness.

The relationships between the components of attitudes also showed that affective responses are better predictors of customer behaviors than cognitive responses, which entails interesting implications as the direct effects of natural environment were similar for both components. This way, malls that intend to captivate affective responses or emotions through environmental design can create favorable experiences by incorporating natural settings and, obtain better results as regards behavioral intentions to visit.

### 5.2. Limitations and future lines of research

This study focused on the relationships between a natural environment and components of attitudes. In this regard, although the environmental perception and behavioral intentions have been widely used as an indicator of attitudinal loyalty in marketing literature, this methodology can be complemented with objective behavioral measures (such as the duration of stay at the mall, number of visits, and number of nature stimuli, among others). This should be considered a potential limitation of the research; thus, we suggest that further studies also consider behavioral measures against objective measures of nature-based stimuli.

On the other hand, future research will have to validate the results in other service environments (e.g., retail stores, health facilities, libraries, and education institutions) using different sub-samples and, if possible, from different countries in order to observe if cultural differences may produce different results. Moreover, the influence of different moderators (gender, age, companions, etc.) could be analyzed because literature has shown these may influence the assessment of a mall environment (Gilboa & Vilnai-Yavetz, 2010).

Finally, our results must be cautiously generalized because this study considers a first approach to structural relationships among the proposed variables, in addition to the location of the study in a specific city and with a specific age distribution. Therefore, we encourage professionals and researchers to contrast our results, especially when considering the progressive growth, consolidation,

and socioeconomic impact of these commercial locations in Latin America (ICSC, 2017).

## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at [oi:https://doi.org/10.1016/j.iedeen.2018.08.001](https://doi.org/10.1016/j.iedeen.2018.08.001).

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