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The impact of perceived restaurant spatial design on word-of-mouth: A decision tree approach

Abstract

Purpose – The current work investigates which elements of restaurant spatial design most strongly influence customer experience. This study addresses a gap in empirical hospitality research by examining how customers perceive restaurant spatial design and identifying which elements most influence their intention to share positive word-of-mouth.

Design/methodology/approach – This interdisciplinary study, bridging hospitality and spatial design, developed a conceptual framework by integrating insights from spatial design theory and hospitality research. Based on this framework, a decision tree algorithm was employed to identify the factors with the greatest impact.

Findings – Among the eight factors tested, the analysis identified gratification as the most influential design factor in predicting positive word-of-mouth, followed by aesthetics. These two factors most clearly differentiated customers with high and low intentions to recommend the restaurant to others.

Originality/value – This study provides original empirical evidence on how restaurant spatial experiences function as antecedents of behavioral intention. The findings provide practical insights for hospitality professionals seeking to enhance customer experience through effective spatial design, thereby supporting marketing and management strategies.

Keywords restaurant spatial experience, perceived spatial design factors, word-of-mouth, gratification, aesthetics, engagement

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1. Introduction

Restaurant spatial design influences customer comfort and satisfaction by shaping the overall dining experience. A thoughtful design fosters positive emotions and engagement throughout customer visits (Horng *et al.*, 2013a; Horng *et al.*, 2013b). In practice, the industry increasingly recognizes that design is not only central to how guests feel but also to how they evaluate the brand, influencing loyalty and return visits (Han and Ryu, 2009). For restaurant owners and managers, investing in well-designed spatial environments has therefore become a strategic priority, directly tied to customer perceptions and long-term business performance.

Nonetheless, few studies have made a comprehensive examination of restaurant spatial design factors as antecedents of consumer behavioral intention in their own right. Traditional research on store or restaurant atmospherics has dispersed spatial design elements across multiple dimensions by blending them with other tangible and intangible elements of atmospheric stimuli. What aspects of visual design promote customer engagement with a restaurant environment? The present study addresses this gap by considering restaurant spatial design in a holistic manner, exploring how perceived spatial design variables shape diners' behavioral intentions.

Based on the *phenomenology of space* and the related literature review (Perolini, 2014; Merleau-Ponty, 1962), we construct a framework comprising eight perceived design factors (engagement, uniqueness, aesthetics, symbolism, functionality, gratification, arousal, and dominance) to determine the extent to which these factors influence consumers' inclination to share positive word-of-mouth (WOM). Thus, we formulate the following questions:

Research Question 1 Is consumer perception of engagement (Q1a), uniqueness (Q1b), aesthetics (Q1c), symbolism (Q1d), functionality (Q1e), gratification (Q1f), arousal

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(Q1g), or dominance (Q1h) significantly associated with intention to share positive word-of-mouth about the restaurant?

Research Question 2 If yes, which factors are more significant and have greater predictive power to forecast positive WOM about the restaurant?

This study adopts a decision tree algorithm to achieve robust variable identification and generate interpretable outcomes that advance hospitality discipline and practice. The value of this methodological tool remains underutilized in hospitality despite its advantages in interpretability, variable identification, data flexibility, and visualization (Kuhn and Johnson, 2013). Therefore, this study makes a theoretical contribution to hospitality research by demonstrating the potential of an underexplored method and by adopting a phenomenological lens on restaurant spatial experience through an interdisciplinary dialogue with spatial design. Practically, the study provides new insights for hospitality professionals seeking to develop effective management and marketing strategies.

2. Literature review

2.1 Theoretical background

According to the phenomenology of space, a person's experience of space is not solely a function of thought, nor of the presence of physical objects, but a reciprocal and pre-reflective interaction between the person and their surround (Merleau-Ponty, 1962). In other words, space is a subjective entity engendered by one's embodied sensory experience: bodily movements and sensory perceptions participate in developing the true meaning of a space (Rezeanu, 2018). This concept, referred to as environmental embodiment (i.e., how people physically experience and interact with their surroundings) (Perolini, 2014), has significantly impacted the disciplines of

architecture and spatial design. Drawing upon this theory, this paper eschewed asking about particular environmental elements as is traditional in consumer research; instead, it considered spatial design in a holistic manner, conceptualizing eight perceived characteristics and exploring their relationships with customer behavioral intention.

To derive the perceived spatial design factors of restaurants, we conducted an intensive review of architecture and interior design literature concerning the phenomenology of space. We conducted our literature review based on the preferred reporting items for systematic reviews and meta-analyses (PRISMA, 2015). Database searches were conducted in both English and Korean to ensure comprehensive identification of relevant studies, leveraging the bilingual capacity of the research team and allowing for broader cultural perspectives. At the full-text stage, we included both conceptual and empirical studies, excluding studies that lacked direct relevance to phenomenology of space, spatial design, or restaurant consumer experience. Ultimately, from the expression characteristics described in 84 academic articles on architectural and interior design, as well as hospitality studies (Figure 1), we identified eight perceived spatial design factors that are enumerated in the following section.

[Figure 1]

2.2 Perceived spatial design factors of restaurants

2.2.1 Engagement

Design that incorporates the concepts of place-making and dwelling can significantly impact how users engage with and experience a space (Perolini, 2014). Perceived engagement relates to place attachment, in which individual responses and actions blend spatially through bodily co-presence and social involvements grounded in place (Seamon, 2020). Translating this theoretical perspective into restaurant spatial design suggests that engagement is reflected in the

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extent to which design features encourage customers to connect with the environment and interact socially within it. Consumer studies likewise emphasize engagement as a key concern. Odoom *et al.* (2017) highlighted the vital role of customer engagement and entertainment in capturing maximum attention for a brand: that is, engagement nurtures a profound attachment to a brand through effective entertainment. Choi and Kandampully (2019) investigated how the atmosphere of upscale hotels generates emotional connections in customers, and found atmospheric elements, particularly room design, to influence customer engagement and promote WOM. Thus, the role of a space in promoting engagement may also be of substantial import to the restaurant dining experience.

2.2.2 Uniqueness

The spatial design of a restaurant should aim to create a unique experience for customers, thereby encouraging return visits (Pecotić *et al.*, 2014). Uniqueness, as an expression of creative design, plays a critical role in shaping customers' positive responses to the restaurant space (Horng *et al.*, 2013a; Horng *et al.*, 2013b). In architecture, the particular types and qualities of materials used for a given interior can contribute to its uniqueness (Miller, 1997). Material choices and detailing co-produce the multisensory atmosphere of a place which is central to how people register distinctiveness and remember spaces (Pallasmaa, 2012). Such environmental cues guide appraisals and behaviors, linking spatial features to perceived uniqueness. From the viewpoint of the phenomenology of space, it is important to note that each person's spatial experience is inherently unique, informed by their individual bodily and sensory experiences (Perolini, 2014). Thus, perceived uniqueness can be understood as the process by which an individual experiences a space and associates their personal identity with its character (Seamon, 2020). With this in mind, interior designers should assess the uniqueness of design techniques to

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ensure distinction, attractiveness, and suitability for embodied experiences (Abdul-Khaleq and Abdul-Hamid, 2022).

2.2.3 Aesthetics

Aesthetic, which can be defined as visual appeal or visual attractiveness, is a universal variable that appears in all domains of art and design (Lee and Ostwald, 2023; Lee and Lim, 2023). Phenomenology has interacted extensively with art. On the one hand, phenomenologists use artwork to deepen their understanding of perception, consciousness, and ontology (Kwon and Iedema, 2022); on the other, artworks can be interpreted by setting aside prior judgments and approaching them as they present themselves to consciousness. Such direct, unbiased experience can lead to a deeper and more authentic aesthetic appreciation.

In spatial design, aesthetic attributes influence emotional perceptions (Alfakhri *et al.*, 2018), customer behavior (Orth and Wirtz, 2014), consumer attachment (Chitturi *et al.*, 2008), and evaluations and loyalty (Liu and Tse, 2018; Anantadjaya *et al.*, 2017). The restaurant design literature further highlights the roles of ambient lighting (Wu *et al.*, 2021) and interior color (Tantanatewin and Inkarojrit, 2018). Alfakhri *et al.* (2018) also found hotel interior design and its aesthetics to be important influences on hedonic consumer groups, directly impacting spending, WOM, and loyalty. With regard to restaurants specifically, Horng *et al.* (2013a) showed aesthetic appeal and visual virtues to enhance restaurant performance. Overall, restaurant consumers tend to respond more positively when the aesthetic is perceived as cohesive and comprehensive, which enhances their spatial experience.

2.2.4 Symbolism and functionality

Symbolism plays a crucial role in forming place identity, as individuals interpret themselves through environmental meanings and establish a sense of belonging (Erasmus *et al.*,

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2015). That is, if a person perceives a place as having a certain symbolic value or significance, they are more likely to associate their personal identity with that place. Many design projects accordingly incorporate cultural symbolism (Lee, 2022), which can deepen the sense of connection by evoking cultural memories, identities, or affiliations. In restaurant spatial design, symbolic design elements infuse customer perceptions with impressions typical of a culture, country, or style (Jang and Park, 2016). These individual design elements influence a customer's symbolic experiences, the continuous flow of which ultimately comprise their perception of the restaurant space (Kwon and Iedema, 2022). This blending of intellect and emotion serves as a crucial catalyst for generating new meanings and functions of the restaurant space.

In product design, functionality refers to the product's effectiveness in accomplishing its intended purpose (Bloch, 2011). Functionality influences purchase intention and WOM directly, and also indirectly through brand attitude (Homburg *et al.*, 2015). Meanwhile, utilitarian properties enhance prevention emotions such as confidence and security, and in so doing both increase satisfaction and indirectly affect repurchase intentions and WOM (Chitturi *et al.*, 2008). Candi *et al.* (2017) also demonstrated functional product design to be connected to consumer behavioral response; notably, the impact of functional design on behavior was stronger for products with high involvement. In the context of spatial design, functionality acts alongside aesthetic appeal to shape customer perception (Alfakhri *et al.*, 2018). Functionality in restaurant design considers not only the adequacy and efficiency of each design element or their combinations, but also incorporates consumers' overall performance and experience in the restaurant space.

2.2.5 Gratification, arousal, and dominance

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From the perspective of phenomenological space, perceptions of spatial design are linked with emotions (Lee, 2022). That is, one's spatial experience in a place connects to the emotions generated by the place, which in turn solidify attachments to the environment (Seamon, 2020). As qualitative studies in architectural and interior design have validated this relationship of space and emotion (Lee, 2022), we added emotional perceptions into our spread of perceived spatial design factors. Emotional responses are routinely measured using the pleasure, arousal, dominance (PAD) scale, which considers all emotional states to consist of some mix of pleasure and arousal, and a subset to also incorporate dominance (Mehrabian and Russell, 1974). Positive experiences require pleasure, with arousal serving to modulate the intensity; high arousal without pleasure may reflect negative emotions such as anxiety rather than excitement (Mehrabian and Russell, 1974; Ryu and Jang, 2008). Pleasure describes the affective state of satisfaction or joy; here we use the term "gratification" in the interest of aligning with research in architectural design (Farooq *et al.*, 2020). Arousal refers to a feeling of alertness or stimulation, and dominance to a sense of control, influence, or importance. In spatial design, dominance is associated with spaces that create a strong, often awe-inspiring sense of presence. For example, grand entrances, monumental scale, or visually striking interiors may cause customers to feel emotionally moved and deeply influenced by the space. This reflects the environment's power to leave a memorable, commanding impression. In hospitality research, dominance has also been examined more functionally, as spatial or atmospheric elements that implicitly guide or regulate guest behavior (Motowilowa *et al.*, 2024). These perspectives suggest that dominance encompasses both the emotional impact of space and its subtle ability to shape customer actions. Nusairat *et al.* (2020) conducted an empirical study on restaurant interior design and found design to be crucial in evoking pleasure and arousal, which ultimately influenced customer

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behavioral intentions. Collectively, these studies illustrate the utility of gratification, arousal, and dominance as a comprehensive framework for understanding the emotional dynamics that underpin an individual's responses to environmental stimuli, including restaurant interior design, along with the individual's subsequent behavior. Appendix A provides definitions and restaurant examples for each design factor.

In summary, these factors are theoretically grounded, spanning the key dimensions of spatial experience. Among the numerous environmental attributes in the literature of architecture, interior design, and hospitality, this study focused on factors that capture spatial design at an experiential level, while moving beyond overlapping, highly descriptive, or context-specific elements. Each factor captures a distinct aspect of the restaurant experience, yet together they form a holistic framework for understanding how design shapes customer perceptions and behaviors.

2.3 Positive word-of-mouth

Positive WOM occurs approximately three times as frequently as negative WOM (East *et al.*, 2007), and hence has a key role in attracting new customers (Matzler *et al.*, 2019). A number of studies have focused on positive WOM in the restaurant setting from a service perspective. Kim *et al.* (2009) showed DINESERV dimensions to positively impact positive WOM in university foodservice establishments, and Jeong and Jang (2012) likewise showed food quality, service employee, and atmosphere to influence positive WOM in an online context. While positive WOM may be more common, negative WOM tends to exert a stronger influence on consumer behavior while positive WOM may be more common (East *et al.*, 2007). Therefore, restaurants should not only aim to delight but also carefully avoid design-induced discomfort that could fuel negative WOM. Overall, a great many restaurant studies have found that positive

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WOM is enhanced by factors such as customer satisfaction, atmospherics, food quality, service quality, perceived value, and price (Konuk, 2019).

2.4 Identification of variables

Based on the preceding literature review, the study identified the core constructs. First, perceived spatial design factors of restaurants are conceptualized as multidimensional, including engagement, uniqueness, aesthetics, symbolism and functionality, gratification, arousal, and dominance. Second, positive WOM represents the outcome variable that reflects customers' willingness to share favorable impressions of the restaurant with others. Together, these variables form the basis of the conceptual framework and subsequent analysis.

3. Methods

3.1 Research design

To address the research questions, this study employed a quantitative survey approach and applied two complementary analytic techniques. Confirmatory factor analysis (CFA) was first conducted to validate the measurement model. Following this, decision tree modeling was used to identify the most influential spatial design factors in predicting consumer responses. Decision trees are particularly suitable for exploratory studies in hospitality and tourism, offering ease of interpretation, identification of key constructs, flexibility in handling data types, and a means of visualization (Kuhn and Johnson, 2013). Participants were randomly assigned to one of two design conditions ("simple" vs. "decorative"), which were selected to provide a clear contrast in dominant spatial design factors while maintaining comparability in other aspects of the restaurant environment. Additionally, we conducted supplementary k-means cluster analysis for each design type to identify distinct consumer segments.

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3.2 Sampling and procedure

We disseminated an online survey in South Korea via email invitations, using convenience and snowball sampling. Eligibility was limited to adults aged 18 or older residing in the metropolitan area, where dining out is a common practice. We collected a comprehensive dataset of 216 responses for the main data analysis (simple restaurant design = 102; decorative restaurant design = 114) The sample size was adequate, exceeding the minimum threshold established by power analysis (G*Power 3.1, N = 128 given a power of 80% and a medium effect size of 0.4) and provides adequate cases-per-parameter ratios for confirmatory factor analysis.

The survey incorporated two restaurant spatial designs selected from two professional interior publications (Roth, 2008; Interiors, n.d.) according to the following criteria: 1) integrates the identified design factors in a balanced manner; 2) does not contain any elements that could potentially introduce bias to participants' views; 3) represents a contemporary and standard aesthetic congruent with restaurants frequented by ordinary customers, without leaning towards excessively avant-garde or outdated styles; and 4) differs from the other selected design in terms of the dominant spatial design factors. The selected designs were respectively labeled as "simple" and "decorative" (Figure 3). Including expert panel review, the two were chosen based on differences in primary spatial design factors, while both reflect midscale restaurant interiors commonly found in urban settings and suggest comparable service levels. An expert panel of two professors and four doctoral students reviewed the restaurant design images to ensure clarity, appropriateness, and distinction between the simple and decorative categories. To isolate the effects of spatial design, no identifying information about the restaurant (e.g., name, location, menu, or service style) was provided alongside the images. This approach helped minimize

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expectation bias and ensured that participants' responses were based solely on visual design features. The participant profile data showed balanced distributions across gender (44.6% female), age (32.4% 18–30, 38.9% 31–40, 21.3% 41–50, 7.4% 51+), and marital status (58.8% single). Educational background included 12.0% with a high school diploma, 24.5% currently undergraduate, 45.4% with a bachelor's degree, and 18.1% with a graduate degree. The study was reviewed by the University Institutional Review Board and deemed exempt under Rule 4(ii) (IRB ID: 1827.22).

[Figure 3]

3.3 Measures

All measurement items were adopted from prior studies, with contextual modifications to fit this study's spatial design context. To establish content validity, the same expert panel reviewed the measures for clarity, relevance, and alignment with the constructs. A 5-point Likert scale, anchored by "strongly disagree" (1) and "strongly agree" (5), was employed to assess items for the constructs of engagement, uniqueness, aesthetics, symbolism, and functionality. We adapted the scale items from consumer research: engagement (Odoom *et al.*, 2017), uniqueness (Erasmus *et al.*, 2015), aesthetics (Orth and Wirtz, 2014), symbolism, and functionality (Homburg *et al.*, 2015). For gratification, arousal, and dominance, a 5-point bipolar adjective scale was used (e.g., 1= frustrating, 5= gratifying, as an example item for gratification.), adapted from the PAD model (Mehrabian and Russell, 1974). See Table 1 for full anchor pairs. Finally, two items from Kim *et al.* (2009) were used to assess customers' intention to spread positive WOM about the restaurant in the photo stimuli. Appendix B presents a comprehensive overview of all constructs' scale items.

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4. Results

4.1 Measurement model

To ensure the validity of our measurement model, we conducted a single-factor CFA for each of the nine constructs (eight spatial factors plus WOM). The analysis was carried out using Mplus v. 7.31, with parameter estimation achieved via the maximum likelihood method. To explore which constructs most strongly influence WOM, we constructed a decision tree model. CFA validated the single-factor measurement model for each of the nine constructs: engagement, uniqueness, aesthetics, symbolism, functionality, gratification, arousal, dominance, and WOM. All item factor loadings were greater than or equal to 0.50, ranging from 0.50 to 0.91 (Appendix B). All single-factor measurement models provided an excellent fit to the data with CFI values in the range of 0.97 to 1.00 (RMSEA = 0.000 for all constructs) and the SRMR value in the range of 0.000 to 0.006 (Hooper *et al.*, 2008; Hu and Bentler, 1999). The target variable, WOM, was split into the high and low groups based on the median for each simple (med = 3.50) and decorative restaurant spatial design (med = 4.00) to generate a classification tree. The validity of the eight constructs was assessed through both convergent and discriminant measures. The results affirmed convergent validity since all path weights were statistically significant ($p < .001$) (Nunnally and Bernstein, 1994). Discriminant validity was checked by correlation coefficients among all pairs of constructs in our model. The result indicated that all correlations across constructs were below the threshold of 0.85, supporting the discriminant validity of nine constructs (Fornell and Larcker, 1981).

4.2 Decision tree models

To identify which spatial design constructs most strongly explain consumers' intention to engage in positive WOM, we constructed decision tree models for each of the two designs.

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WOM served as the binary target variable (high vs. low), and the eight spatial design factors were used as independent variables. In the decision tree analysis, we applied a 70/30 split to divide the data into training and testing sets, following standard practice in predictive modeling (Kuhn and Johnson, 2013). We used 70% of the sample as the training dataset (simple design n = 71; decorative design n = 79) and 30% as the testing dataset (simple design n = 31; decorative design n = 35). We first ran the model with the training dataset for each simple and decorative design and then assessed the model on a testing dataset (Therneau and Atkinson, 2015). Using R v. 4.1.3, we generated an optimal binary tree model for each restaurant design that included eight constructs and the WOM target variable from the training data (Fig. 3 and Fig. 4). To use WOM as a classification target, we converted the continuous WOM scores into a binary variable (high vs. low) based on a median split for each design condition. The outcome of the high WOM group was denoted as "Yes," and that of the low WOM group as "No." Terminal nodes in the tree indicate predicted classification (Yes/No), with associated probabilities of classification.

4.2.1 Simple restaurant design (Model 1)

The root node (n = 71, 70% of the full data) of the simple design decision tree (Figure 3) was divided into two branches based on the key indicator of gratification ($< 4.4, \geq 4.4$). When gratification was 4.4 or higher, a high WOM group in the terminal node was anticipated (n = 11, 15%, *probability* = 1.00). This segment exhibited perfect classification (probability = 1.00), indicating all cases in the node were correctly predicted as high WOM. Subsequently, the node branched again based on aesthetics. Customers who rated aesthetics above or equal to 3.3 and symbolism at or above 3.2 fell into a high WOM group category in the final node (n = 13, 18%, *probability* = 0.77). However, symbolism less than 3.2 predicted a low WOM group, with 63% probability of observation (n = 19, 27%). Finally, those perceiving gratification below 4.4 and

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aesthetics under 3.3 were categorized in a low WOM group in the ultimate node (n = 28, 39%, *probability* = 0.89), having the second highest observation likelihood within this model.

[Figure 3]

[Figure 4]

4.2.2 Decorative restaurant design (Model 2)

Similar to the model for the simple restaurant design, the root node (n = 79, 70% of the full data) in the decorative design decision tree (Figure 4) was divided into two branches based on gratification (< 3.1, ≥ 3.1). This node was then further segmented based on levels of engagement and aesthetics. Customers who perceived gratification at or above 3.1 and engagement at or above 4.5 were predicted to fall within a high WOM group at the terminal node (n = 20, 25%, *probability* = 0.95), representing the second-highest likelihood of occurrence within the decorative design model. On the other hand, when engagement scored below 4.5, yet functionality was 3.2 or higher, and aesthetics were 3.3 or higher, a high WOM group prediction was still maintained (n = 22, 28%, *probability* = 0.77) in the final node. However, when aesthetics scored below 3.3, a low WOM group was anticipated (n = 9, 11%, *probability* = 0.56). For those with gratification below 3.1 and engagement under 4.5, functionality below 3.2 also led to forecasting a low WOM group (n = 7, 9%, *probability* = 0.71). When customers reported gratification of at least 3.8 and aesthetics exceeded 3.8, a high WOM group was forecasted (n = 9, 11%, *probability* = 0.56).

4.3 Model performance and summary

To diagnose the decision tree models' prediction accuracy, we performed a receiver-operating characteristic (ROC) analysis on a subset of the dataset (30% of the dataset) for each

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model, targeting simple and decorative restaurant designs. The ROC curve (AUROCC) revealed both models demonstrated predictive effectiveness (Fielding and Bell, 1997). Regarding the simple design model (Model 1), results indicated a 0.84 AUROCC, a 0.26 error rate, and a 0.74 accuracy rate, suggesting strong predictive performance (Chirouze *et al.*, 2002; Song and Kim, 2018). The decorative design model displayed an AUROCC of 0.67, an error rate of 0.43, and a 0.57 accuracy rate, indicating less reliable predictions, likely influenced by the limited size of the testing sample (n = 34) (Chirouze *et al.*, 2002). Lastly, to further evaluate the models, we analyzed both models using the complete dataset (simple design = 102; decorative design = 114). Model 1 indicated an AUROCC of 0.85, with a 0.21 error rate, and a 0.79 accuracy rate, and Model 2 reached an AUROCC of 0.81, a 0.27 error rate, and a 0.73 accuracy rate.

Using decision tree models, we investigated the importance of our eight identified spatial design factors as constructs of WOM in relation to two styles of restaurant design. The decision tree model for the simple restaurant design (Model 1) identified three critical factors, aesthetics (Q1c), symbolism (Q1d), and gratification (Q1f), all of which associated positively with customer WOM. Hence, Q1c, Q1d, and Q1f were supported, while Q1a, Q1b, Q1e, Q1g, and Q1h were not. Meanwhile, the model for the decorative restaurant design (Model 2) identified four predictive factors, engagement (Q1a), aesthetics (Q1c), functionality (Q1e), and gratification (Q1f). Hence, Q1a, Q1c, Q1e, and Q1f were supported, while Q1b, Q1d, Q1g, and Q1h were not. Both models highlighted gratification and aesthetics as key constructs, with gratification consistently being the most important in predicting consumer WOM segments; this constitutes the answer to Q2. Across both models, symbolism and functionality did not emerge as primary split variables but appeared only under specific conditions at deeper levels of the decision trees. In the simple design model, symbolism contributed to WOM prediction only

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when gratification and aesthetics exceeded threshold levels, while in the decorative design model, functionality influenced WOM classification only in conjunction with engagement and aesthetics. This pattern indicates that these constructs may operate implicitly and play conditional roles in shaping WOM.

[Figure 5]

4.4 Cluster analysis

K-means clustering (Figure 5) revealed two distinct consumer segments in each design type. For simple designs (silhouette=0.190), Cluster 1 (53.9%) labeled "Minimalist appreciators", exhibiting above-average ratings on aesthetics (M=3.94), engagement (M=4.32), and uniqueness (M=4.35), coupled with lower arousal (M=3.82) and dominance (M=2.81). This segment indicates a comfortable appreciation of minimalist style. Cluster 2 (46.1%) showed lower aesthetic (M=2.81) and engagement (M=3.62) scores but higher arousal (M=4.16) and dominance (M=3.17), indicating the lighting stimulated them but minimalism failed to engage. Thus, we termed this group "Stimulation seekers." For decorative designs (silhouette=0.175), Cluster 1 (36.8%) exhibited significantly lower aesthetics (M=2.67) and symbolism (M=2.28) with elevated arousal (M=3.82) and dominance (M=3.45), suggesting visual overwhelm from decorative complexity. We labeled them "Visual minimalists." Meanwhile, Cluster 2 (63.2%) demonstrated strong appreciation across aesthetics (M=4.09), engagement (M=4.26), and uniqueness (M=4.62), earning the label "Decoration enthusiasts." These segments suggest design complexity preference represents a fundamental dimension of consumer heterogeneity. Approximately 37-46% of consumers prefer the opposite complexity level from what they viewed.

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5. Discussion and future research

5.1 Implications

The study contributes to hospitality research by providing empirical evidence that links perceived spatial experiences with behavioral intention, addressing a gap in the literature on restaurant design. The findings show that gratification functions as a fundamental design outcome that consistently drives WOM across contrasting interior styles, while aesthetics can offset low gratification and still foster positive responses. This moves the literature forward by demonstrating how spatial aesthetics and gratification jointly shape behavioral intentions, extending prior work on the role of aesthetics in hospitality environments (Orth and Wirtz, 2014; Alfakhri et al., 2018). This study contributes to theory in two ways. First, it systematically organizes eight spatial design factors within the conceptual background of phenomenology of space. While prior research has examined individual factors such as aesthetics, functionality, or symbolism, often without a unifying theoretical background (Apaolaza *et al.*, 2020), no study has integrated all eight spatial design factors into a single framework. The present research offers a more comprehensive understanding of spatial experience by positioning them together. Second, this study demonstrates how phenomenology of space can inform empirical analysis and advance design-centered consumer behavior research. Whereas previous research has often treated physical design as a contextual element, the present study highlights perceived spatial experience, shaped through sensory response and human-environment interaction, as an active driver of customer outcomes.

For practitioners, the findings provide useful insights into how gratification and aesthetics can be integrated into design strategies to enhance customer experience and foster positive WOM, thereby supporting long-term business success. Unlike other factors that capture discrete

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attributes, gratification reflects ease and enjoyment that arise when design elements harmonize. Its robustness across both simple and decorative designs highlights its integrative role, synthesizing multiple design cues into a holistic affective outcome that strongly drives WOM. This shows that design-driven comfort is a baseline requirement. It represents more than simple satisfaction; it is the holistic affective response that emerges when spatial elements such as lighting, seating, and layout combine to make customers feel physically at ease and emotionally relaxed. Findings show, without it, other design elements cannot effectively drive WOM. In practice, this emphasizes that design must be planned not only for appearance but also for how it is felt in use.

Beyond these shared drivers, the two models diverged in meaningful ways. In the simple design, aesthetics and symbolism compensated when gratification was perceived as low. Customers were still likely to share positive WOM if they judged the space to be visually refined or symbolically meaningful, suggesting that minimalist interiors can rely on visual harmony, or thematic cues to enrich otherwise pared-down environments. By contrast, the decorative design revealed a more complex structure. While gratification remained important, WOM also depended on engagement and functionality alongside aesthetics. This indicates that customers entering visually ornate spaces hold higher expectations: they not only seek comfort but also look for stimulating features that capture their interest and layouts that are practical and easy to navigate. Taken together, these findings highlight that gratification and aesthetics are universal drivers of WOM, whereas the secondary factors vary according to design style. For designers and managers, this suggests that design strategies, while aligned with the chosen concept, should aim to prioritize user comfort and gratification. This is further supported by the findings from our additional cluster analysis. In each design condition, approximately half of the participants

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placed greater importance on characteristics associated with the opposite design style. For example, the second segment in the simple design consisted of stimulation seekers, whereas the first segment in the decorative design leaned toward visual minimalism. Not only does this finding identify customer heterogeneity, but it also emphasizes that commercial restaurants, in pursuit of profitability, should consider embracing a broader spectrum of consumer preferences, even when pursuing a specific design style. Thus, this indicates that focusing on gratification as a shared value in two designs could target more diverse consumers. Minimalist settings should emphasize subtle aesthetic refinement and symbolic cues to enrich simplicity, whereas decorative settings should ensure that their visual richness is balanced with engaging features and practical usability. Lastly, this study contributes to design education and training by identifying which elements of interior design are most impactful from the customer's perspective. The results can be integrated into hospitality curricula, helping future professionals understand how design choices influence consumer emotion and behavior.

5.2 Limitations and future research

This study has several limitations that warrant mention. First, since data was collected from only a single country, the findings may not be generalizable. Cultural norms, dining practices, and aesthetic expectations may influence how spatial design cues are perceived, indicating that the findings may differ in other cultural contexts. Additionally, given that this is an exploratory study, the two decision tree models should not be considered generalizable. In particular, the relatively small size of the testing subsample in the split-sample approach may reduce confidence in the stability and generalizability of the model results. Thus, there remains a need for future research to be conducted in diverse contexts to increase validity. Second, given the inherent difficulty of capturing participants' unique prior experiences with behavioral

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intention alone, it would be beneficial for follow-up research to focus on specific segments. For example, a study could investigate how prior experiences with different types of restaurants (such as small and crowded eateries vs. expansive and luxurious establishments) influence perceptions of spatial design factors among the low WOM consumer segment. Third, while the selected visuals emphasized salient design contrasts, the use of static images may not have fully conveyed aspects such as overall layout and flow. Future studies may employ dynamic or multisensory stimuli, such as walkthrough videos, immersive simulations, or controlled field experiments, to better capture how consumers experience restaurant spaces. Other potential future directions include conducting a comparison study of perceptions of restaurant spatial design between a design expert group and a user group, extending this study into a field setting by focusing on different restaurant atmospheres, or extending it to an experiment in the reception of restaurant designs as images on social media.

6. Conclusion

This study examined how customers perceive restaurant spatial design and which factors most strongly predict positive WOM. Drawing on the phenomenology of space and prior research in hospitality and spatial design, we identified eight perceived spatial design factors and applied decision tree modeling to highlight their relative importance. The results demonstrated that gratification consistently emerged as the most critical determinant of WOM across both simple and decorative restaurant designs, while aesthetics also played a prominent role, particularly when gratification was low. These findings underscore the importance of designing restaurant environments that are both gratifying and visually appealing, as these qualities significantly influence customers' willingness to recommend a restaurant to others.

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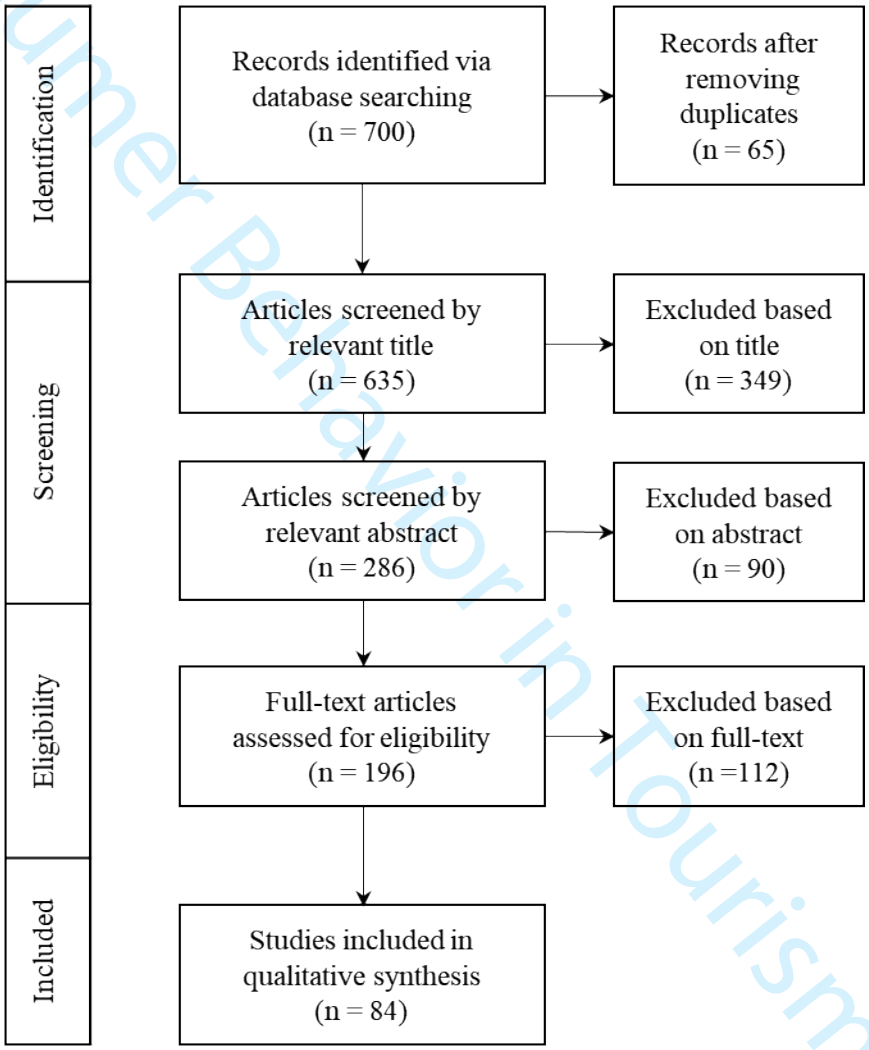
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584 **Figure 1. PRISMA flow diagram.**



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Figure 2. Restaurant visual stimuli

Simple restaurant design	Decorative restaurant design



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Figure 3. Decision tree model 1: Simple restaurant design (n = 102)

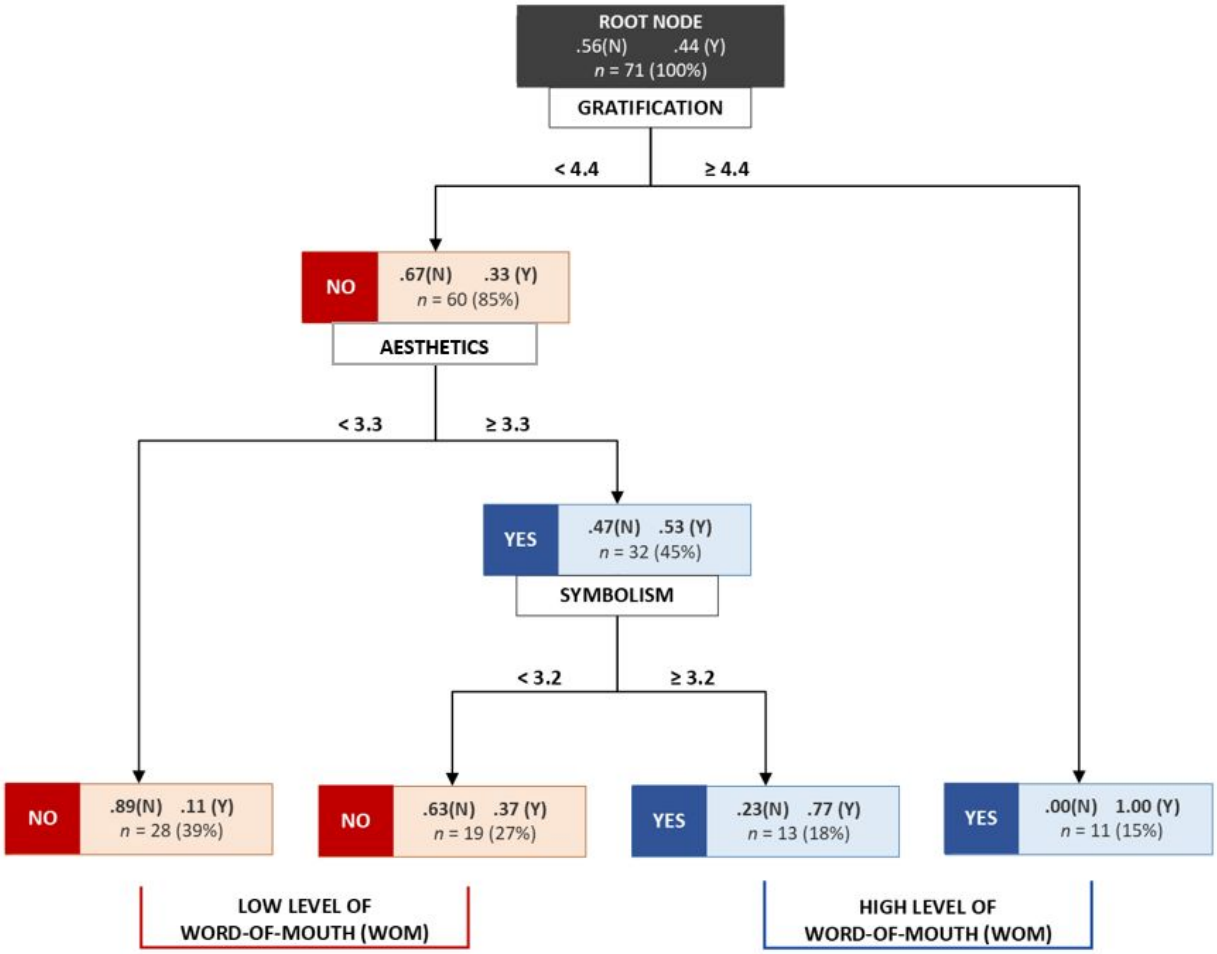


Figure 4. Decision tree model 2: Decorative restaurant design (n = 114

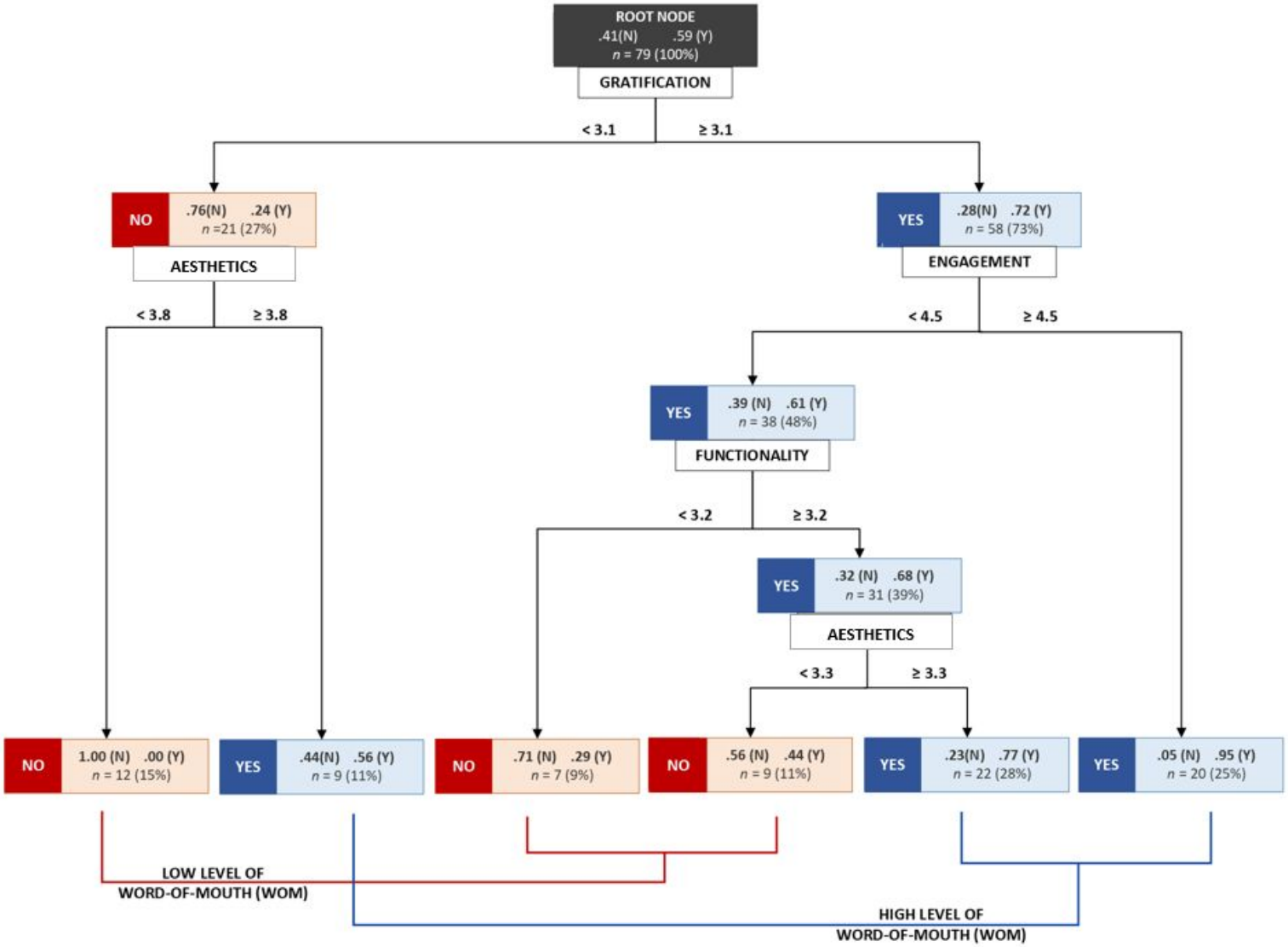
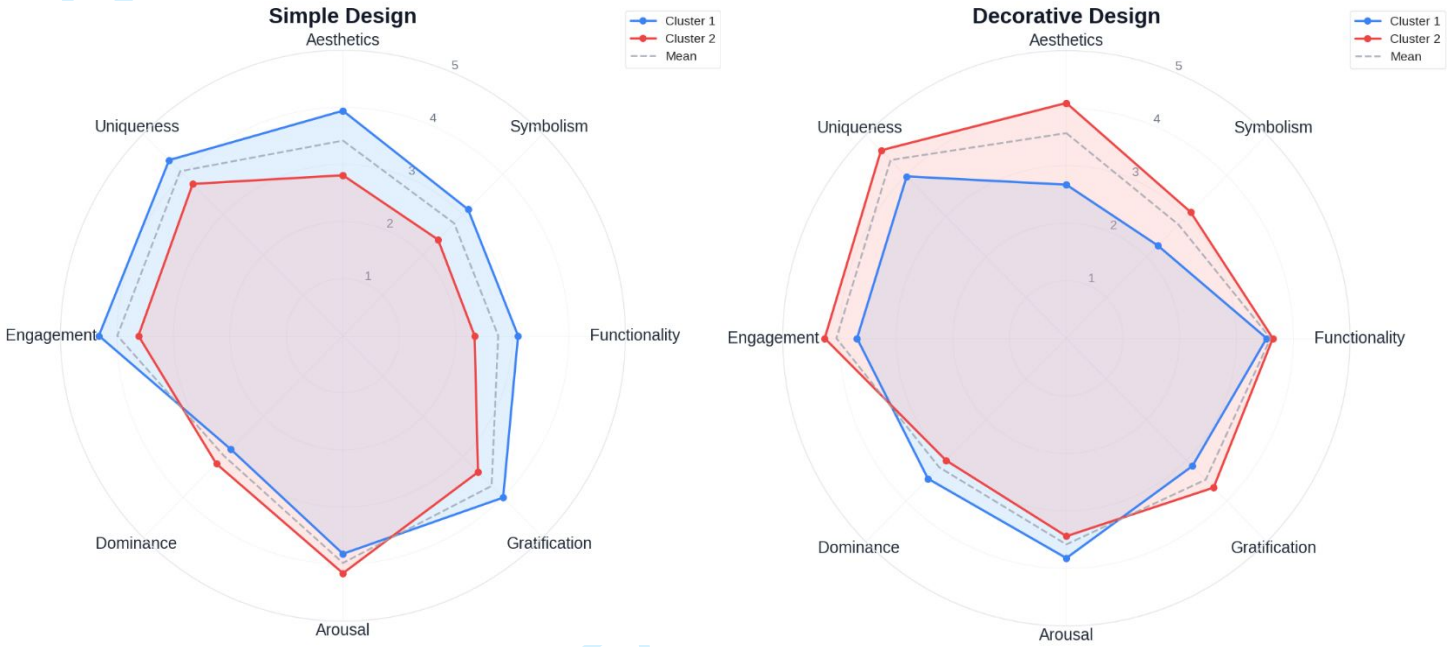


Figure 5. Cluster profile charts



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Appendix A. Summary of spatial design factors and restaurant examples

Spatial design factor	Definition	Restaurant example
Engagement	Perceived when spatial design elements are interesting, intriguing, memorable, or stimulate curiosity.	*Rainforest Café (Orlando, FL)*: Jungle-themed interior with animatronics and storm effects encourages curiosity and exploration.
Uniqueness	Perceived when spatial design elements stand out as unique, extraordinary, or distinctive, often evoking a sense of non-everydayness.	*Sketch (London, UK)*: Themed rooms such as the all-pink Gallery offer a one-of-a-kind dining space.
Aesthetics	Perceived when spatial design elements are visually attractive or beautiful, be it through elegance, luxury, vividness, or a colorful palette.	*Ladurée (Paris, France)*: Elegant pastel colors and ornate interior details create a beautiful, visually refined space.
Symbolism	Perceived when spatial design elements represent or signify a country, region, era, culture, food, people, or style, thereby invoking certain connections or associations.	*Ippudo (New York, NY)*: Japanese interiors symbolize cultural authenticity.
Functionality	Perceived when spatial design elements serve a practical purpose, help partition areas, create movement flow, or possess practical features.	*McDonald's Flagship (London, UK)*: Modular seating, open layout, and clear flow support practical, user-friendly spatial functionality.
Gratification	Perceived when spatial design elements contribute to feelings of comfort, satisfaction, gratification, pleasantness, or relaxation.	*The Cheesecake Factory (Dubai Mall, UAE)*: Spacious booths, warm lighting, and ornate décor foster comfort and satisfaction.
Arousal	Perceived when spatial design elements evoke a sense of excitement or stimulation, or grab attention.	*Sexy Fish (Miami, FL)*: Bold neon lights and eye-catching décor create a stimulating and energetic dining environment.
Dominance	Perceived when spatial design elements are so powerful or overwhelming that they control the atmosphere or space, often through their striking size, vibrant colors, or unconventional materials.	*Alchemist (Copenhagen, DK)*: Massive projections and immersive design create an overwhelming spatial experience.

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Appendix A. Results of one-factor confirmatory factor analyses (N= 216).

Scale	Item Factor Loading	Composite Reliability
Engagement		0.67
The restaurant design is entertaining.	0.58***	
The restaurant design interests me.	0.81***	
The restaurant design is worth remembering.	0.50***	
Uniqueness		0.57
The restaurant design is unique.	0.72***	
The restaurant design is not ordinary.	0.54***	
Aesthetics		0.85
The restaurant design is beautiful.	0.86***	
The restaurant design is visually attractive.	0.86***	
Symbolism		0.78
The restaurant design is symbolic.	0.63***	
The restaurant design reminds me of a specific place (or country).	0.98***	
The restaurant design reminds me of a specific menu item (food).	0.56***	
Functionality		0.83
The restaurant has a functional layout.	0.79***	
The restaurant design directs the flow.	0.86***	
The restaurant design serves to divide the space.	0.70***	
Gratification		0.82
The restaurant design is …		
Frustrating — Gratifying	0.77***	
Annoying — Pleasing	0.71***	
Boring — Relaxing	0.70***	
Unsatisfying — Satisfying	0.72***	
Arousal		0.80
The restaurant design is …		
Calm — Exciting	0.63***	
Relaxing — Stimulating	0.76***	
Restful — Energetic	0.88***	
Dominance†		0.79
The restaurant design is …		
Plain — Assertive	0.64***	
Weak — Strong	0.83***	
Gentle — Controlling	0.75***	
Word-of-Mouth		0.87
I will spread positive word-of-mouth about this restaurant.	0.91***	
I will recommend this restaurant to my family, friends, and others.	0.85***	

Note. *** indicates $p < .001$ (all path weights were significant at $p < .001$)

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