

Impact of Ambience, Layout, and Lighting on Consumer Satisfaction at Fast-Food Restaurants: Moderating Role of Gender

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Abstract

Purpose: This study investigates how dimensions of the physical environment (i.e., ambience, layout, and lighting) impact consumer satisfaction in fast-food restaurants, while also assessing the moderating effect of gender.

Design/methodology/approach: A cross-sectional survey was conducted among 384 patrons of fast-food restaurants in Kathmandu, Nepal, selected through convenience sampling. Data were gathered using a structured questionnaire and analyzed with SPSS v26, employing descriptive statistics, correlation, and multiple regression to examine hypothesized relationships and moderation effects.

Findings: Ambience, layout, and lighting each demonstrated a positive and significant influence on consumer satisfaction, with layout emerging as the most influential factor. Contrary to initial assumptions, gender did not significantly moderate these relationships, indicating similar perceptions across male and female consumers.

Conclusion: The study emphasizes that thoughtfully designed physical environments are critical drivers of consumer satisfaction, offering strategic value for sustaining competitiveness in the fast-food industry.

Implications: The results provide actionable guidance for fast-food managers aiming to enhance customer satisfaction and encourage repeat visits. Emphasizing strategic layout design, alongside appealing ambience and lighting, can serve as a competitive differentiator in the crowded fast-food sector.

Originality/value: Anchored in the Stimulus-Organism-Response (SOR) framework, this study contributes fresh insights by contextualizing the impact of physical environments on consumer satisfaction within Nepal's emerging fast-food industry. It also advances understanding by explicitly testing gender as a moderating factor in this relationship.

JEL Classification: M31, L83, D12, J16

Introduction

In today's intensely competitive hospitality landscape, the physical environment, often conceptualized as the servicescape, has emerged as a critical strategic lever that extends beyond mere aesthetics, actively shaping consumer perceptions, satisfaction, and behavioral outcomes (Bitner, 1992; Kotler, 1974; Ryu & Han, 2011). While core attributes such as food quality and pricing remain fundamental, they are increasingly regarded as baseline expectations in fast-food service, pushing firms to differentiate through experiential and sensory dimensions embedded within the physical environment (Hanaysha, 2016; Abdullah & Ariffin, 2024). Unlike intangible service attributes, the tangible aspects of ambience, layout, and lighting provide immediate, multi-sensory stimuli that directly influence cognitive and affective evaluations, often determining first impressions and subsequent loyalty (Ngah et al., 2022; Omar et al., 2015).

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The SOR framework offers a compelling lens to elucidate this phenomenon, positing that environmental cues (stimuli) shape consumers' internal affective and cognitive states (organism), which then manifest in satisfaction and future behavioral intentions (Mehrabian & Russell, 1974; Suwanamas et al., 2015). Empirical studies demonstrate that well-designed layouts reduce perceptions of crowding and enhance navigability, while ambience and lighting create affective cues that elevate the dining experience, fostering repeat patronage and positive word-of-mouth (Harris & Goode, 2010; Slack et al., 2021; Farooq et al., 2020). Thus, focusing on the physical environment moves beyond transactional quality to cultivate emotionally resonant, differentiated experiences, a source of sustainable competitive advantage in the saturated fast-food market (Ryu & Jang, 2008; Prakash & Sudarvel, 2024; Sharma et al., 2024).

Yet, the influence of these physical elements is not monolithic across all consumer segments. Gender, as a fundamental socio-psychological differentiator, shapes aesthetic preferences, sensitivity to environmental stimuli, and decision-making heuristics in service settings (Lin, 2004; Nguyen & Leblanc, 2002). Prior research in retail and hospitality contexts suggests that men and women process atmospheric cues differently, potentially moderating how ambience, layout, and lighting translate into satisfaction (Namkung & Jang, 2008; Chun & Ochir, 2020). Surprisingly, this moderating role of gender remains largely underexplored in the context of fast-food dining, particularly within emerging markets.

In Nepal, the rapid growth of fast-food establishments driven by urbanization and evolving consumer lifestyles highlights the urgency to understand how physical environments influence customer satisfaction (Rai & Rawal, 2019; Pun, 2022; Balami et al., 2023). However, existing Nepalese studies have predominantly concentrated on price, taste, or general service quality, offering fragmented insights into how carefully curated physical environments impact satisfaction, and overlooking moderating effects such as gender (Dahal, 2023).

This study addresses these critical gaps by systematically examining the impact of ambience, layout, and lighting on consumer satisfaction in fast-food restaurants, while explicitly examining gender as a moderator within the SOR framework. By grounding the analysis in Kathmandu's evolving fast-food market, this study not only contributes novel empirical evidence from an underrepresented South Asian context but also advances theoretical understanding of how physical environments interact with consumer characteristics to shape satisfaction and loyalty intentions.

Literature Review and Hypotheses

SOR Framework

The SOR model developed by Mehrabian and Russell (1974) offers a foundational framework for explaining how environmental stimuli shape consumer psychology and behavior. In this paradigm, stimuli, external cues in the physical environment, affect the organism, encompassing consumers' cognitive and affective states, which then drive behavioral responses, such as satisfaction, loyalty, and purchase intentions.

The SOR model has been extensively applied across hospitality, retail, and service marketing to explain how atmospheric cues influence consumer emotions and behaviors. In hospitality settings, it has clarified how design and ambient conditions elevate pleasure and

arousal, subsequently fostering loyalty and positive word-of-mouth (Suwanamas et al., 2015). In retail, it explains how store layout, lighting, and sensory elements drive purchase decisions through perceived value and emotional engagement (Ali et al., 2016). Studies in restaurant contexts further affirm that elements like layout, ambience, and cleanliness not only shape immediate satisfaction but also strengthen revisit intentions and customer advocacy (Rathnasiri et al., 2025).

Cumulative evidence under this framework highlights that well-orchestrated physical environments enhance consumer moods, perceptions of quality, and experiential value, which directly translate into higher satisfaction and behavioral loyalty. Anchored in this rich empirical tradition, the present study employs the SOR model to examine how ambience, layout, and lighting influence consumer satisfaction in fast-food restaurants.

Physical Environment and Consumer Satisfaction

The conceptualization of the physical environment as a strategic marketing lever dates back to Kotler (1974), who argued that atmospherics shape consumer emotions and drive purchase behaviors. Subsequent frameworks, notably Bitner's (1992) SERVQUAL model, operationalized this into ambient conditions, spatial layout, and symbolic cues, establishing physical environment as a decisive factor in customer experience management.

Empirical research consistently emphasizes that well-designed physical settings elevate consumer satisfaction by shaping affective and cognitive evaluations. Ryu and Jang (2007) demonstrated that facility aesthetics, ambience, and employee interactions significantly impact satisfaction and downstream behavioral intentions. Similarly, Hanaysha (2016) and Tarigan et al. (2020) found that superior physical environments strengthen brand preference and consumer loyalty by exceeding experiential expectations.

Recent studies emphasize differential weights across physical attributes. Lighting emerges as the most critical predictor of satisfaction, surpassing layout and decor (Ngah et al., 2022), while Eni (2022) identified ambience as a stronger driver than price or food quality. Such evidence highlights that the physical environment is not merely a backdrop but a principal determinant of perceived service quality and satisfaction.

Within fast-food contexts, where experiential differentiation is limited by standardized menus, physical cues acquire heightened strategic importance. Prior research in Nepal reveals that ambience and location significantly influence consumer preferences, even outweighing price (Rai & Rawal, 2019). This supports the argument that carefully managed atmospheric and spatial factors are essential for cultivating satisfaction and repeat patronage.

Based on this evidence, the study hypothesizes:

H1: Restaurant's ambience has significant relations with consumer satisfaction.

Spatial layout, encompassing the arrangement and interaction of furniture, fixtures, and facilities, critically shapes consumer satisfaction by influencing comfort, accessibility, and perceived crowding (Harris & Goode, 2010). Empirical evidence suggests that spatial organization facilitates psychological impressions of intimacy and friendliness,

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thereby priming positive emotional responses before direct service evaluation (Lin, 2004). A well-structured layout mitigates crowding, reduces cognitive dissonance, and enhances the overall dining experience, all of which contribute to heightened satisfaction and customer loyalty (Slack et al., 2021).

However, findings on the direct effect of layout within fast-food contexts remain inconclusive. Han and Ryu (2009) found no significant direct impact of layout on satisfaction in fast-service restaurants, implying that its influence may be mediated by other variables or context-dependent. Nonetheless, extant literature predominantly supports that spatial layout indirectly affects behavioral intentions by first shaping comfort and satisfaction (Slack et al., 2021; Lin, 2004).

Given the mixed empirical results and the conceptual relevance of spatial cues in shaping consumer experience, this study posits that layout significantly influences consumer satisfaction in fast-food restaurants. Addressing these inconsistencies, our hypothesis aligns with the broader consensus that a thoughtfully designed spatial environment is indispensable for enhancing customer satisfaction and fostering loyalty in competitive dining markets.

Based on this evidence, the study hypothesizes:

H2: Restaurant's layout has significant relations with consumer satisfaction.

Lighting is a critical environmental cue that shapes consumer behavior and satisfaction in fast-food settings. Research indicates that brighter lighting typically accelerates meal consumption, influencing turnover rates and consumer flow (Benschop & De Castro, 2004). Furthermore, lighting intensity and ambience directly impact patrons' mood, perceived comfort, and overall dining experience, thereby affecting satisfaction levels (Pane, 2020). Contemporary restaurant design increasingly leverages lighting not only for functional purposes but also as a strategic element to create visually appealing atmospheres that encourage social sharing and positive word-of-mouth via digital platforms (Robson, 2013).

Empirical studies consistently demonstrate that well-designed lighting enhances customer perceptions, elevates expectations, and produces a memorable "wow" effect, which is integral to customer satisfaction and loyalty (Pane, 2020; Robson, 2013).

Grounded in this evidence, the hypothesis asserts that lighting significantly influences consumer satisfaction in fast-food restaurants by shaping the sensory and emotional environment, thus contributing to an enhanced dining experience.

Based on this evidence, the study hypothesizes:

H3: Restaurant's lighting has a significant relationship with consumer satisfaction.

Moderating Role of Gender

Prior research indicates that men and women process environmental cues differently, leading to variations in satisfaction and behavioral responses (Mattila & Wirtz, 2001). Empirical studies show that women generally exhibit greater sensitivity to ambient cues like music, scent, and temperature in service settings (Vida et al., 2007). This heightened affective responsiveness may cause women to place more weight on

ambience when evaluating satisfaction. Similarly, research suggests men often prioritize functional aspects of spatial design and efficiency (Machleit et al., 1993). Hence, a well-organized layout may more strongly enhance their satisfaction by reducing perceived shopping or dining effort. Studies highlight that lighting affects perceptions of comfort and aesthetics, with females typically demonstrating higher responsiveness to such atmospheric elements (Quartier et al., 2014).

The SOR model reinforces this relationship by demonstrating that personal characteristics alter the organism's processing of stimuli, thus influencing satisfaction. This aligns with findings in hospitality and retail contexts where demographic moderators like gender shape how environmental cues translate into consumer evaluations (Kim & Moon, 2009; Turley & Milliman, 2000).

Accordingly, this study proposes the following hypotheses:

H4a: Gender moderates the relationship between ambience and consumer satisfaction.

H4b: Gender moderates the relationship between layout and consumer satisfaction.

H4c: Gender moderates the relationship between lighting and consumer satisfaction.

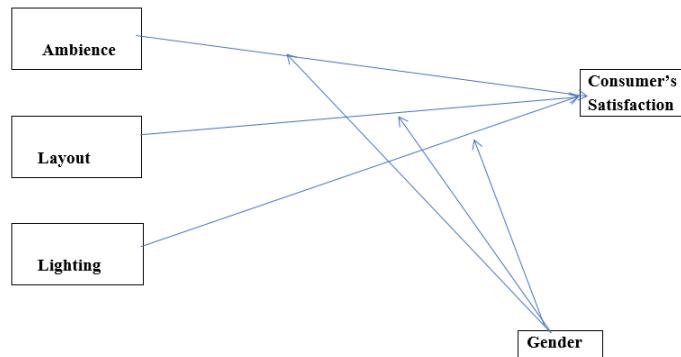


Figure 1: Research Model

Methods

This study employs a descriptive and analytical research design to examine the impact of the physical environment on customer satisfaction in full-service restaurants (FSRs). The descriptive design characterizes the variables, while the analytical design investigates their relationships. A cross-sectional quantitative approach was used, collecting data at a single point in time through a structured questionnaire.

The study was conducted in Kathmandu, Nepal, targeting customers visiting full-service restaurants. Due to the absence of formal population data, a sample size of 384 respondents was determined based on Cochran's (1977) formula for unknown populations. Convenience sampling was employed to select participants from patrons of twenty upscale restaurants across the city.

Primary data were collected via a self-administered questionnaire divided into two sections: demographic information (e.g., age, gender, income, profession) and twenty-five items measuring key

variables on a five-point Likert scale. The questionnaire was adapted from prior validated studies (Oliver, 1981; Ryu & Jang, 2007; Tuzunkan & Albayrak, 2016) and refined based on expert feedback.

A pilot study involving 30 respondents was conducted to assess the questionnaire's clarity, consistency, and validity. Cronbach's alpha indicated high reliability with values of 0.856 in the pilot and 0.843 in the main study, confirming the instrument's internal consistency (all variables > 0.70).

Data were entered into SPSS v26 for analysis. Descriptive statistics such as frequency, percentage, mean, and standard deviation were computed. Inferential analysis included correlation to explore relationships among variables and multiple regression to assess the influence of ambience, layout, and lighting on customer satisfaction. The regression model is specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:

Y = Customer Satisfaction

X_1 = Ambience

X_2 = Layout

X_3 = Lighting

β_0 = Constant

$\beta_1, \beta_2, \beta_3$ = Regression coefficients

ϵ = Error term

Results and Analysis

Demographic Profile

The study surveyed 384 respondents with balanced gender representation (50.5% male, 49.5% female). The largest age group was 26–40 years (44.5%), followed by 15–25 years (33.3%), indicating a predominantly young customer base. Income distribution showed that 66.4% of respondents earned above Rs. 100,000, suggesting higher-income groups frequent upscale fast-food restaurants more than lower-income groups (5.7% earning below Rs. 40,000). Professionally, job holders (48.4%) and businesspersons (38%) constituted the majority of patrons, followed by students (9.4%), reflecting that individuals with stable incomes are primary visitors to these establishments.

Descriptive Statistics of Research Variables

Table 1 reveals that the mean scores for ambience (3.6), layout (3.7), lighting (3.4), and consumer satisfaction (3.2) all exceed the midpoint of 3, indicating generally positive consumer perceptions of these aspects. Among these variables, the layout received the highest mean score, reflecting greater satisfaction compared to lighting and ambience. This suggests opportunities for enhancing lighting and ambience to further improve customer experience. Overall, consumers view the physical environment of fast-food restaurants as moderately favorable, underscoring the importance of these factors in shaping dining satisfaction and well-being.

Table 1: Descriptive Analysis of Research Variables

Variables	Mean Value
Consumer Satisfaction	3.2
Ambience of a fast-food restaurant	3.6
Layout of a fast-food restaurant	3.7
Lighting of a fast-food restaurant	3.4

Correlation Analysis

The correlation analysis (see Table 2) indicates a significant positive relationship between consumer satisfaction and the physical environment factors (ambience, layout, and lighting) at the 1% significance level. These results demonstrate a strong association between the quality of the physical environment and customer satisfaction in fast-food restaurants in Kathmandu Valley. Specifically, the findings suggest that consumer satisfaction is closely influenced by the ambience, layout, and lighting, highlighting their critical role in enhancing the dining experience.

Table 2: Pearson's correlation among variables

	Consumer Satisfaction	Ambience	Layout	Lighting
Consumer Satisfaction	1	+0.743**	+0.771**	+0.665**

Regression Analysis

Table 3: Regression Result

Model		β	S.E.	t-value	p-value
1	(Constant)	0.185	0.118	1.567	0.005
	Ambience	0.287	0.153	2.654	0.003
	Layout	0.368	0.053	5.041	0.000
	Lighting	0.219	0.112	5.377	0.009
	R-Square	0.737			
	Adjusted R-square	0.733			
	F-statistics	176.02 (0.000)			

a Dependent Variable: Consumer satisfaction

The regression model is specified as:

$$Y = 0.185 + 0.287X_1 + 0.368X_2 + 0.219X_3$$

The model explains 73.7% of the variance in consumer satisfaction ($R^2 = 0.737$), indicating a strong explanatory power. The overall model fit was significant ($F(3, 380) = 176.02, p < 0.001$), confirming the collective predictive strength of the physical environment variables.

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Each predictor variable demonstrated a significant positive effect on consumer satisfaction. Layout emerged as the strongest predictor ($\beta = 0.368$, $p < 0.001$), followed by ambience ($\beta = 0.287$, $p = 0.003$) and lighting ($\beta = 0.219$, $p = 0.009$). Thus, this finding indicates that physical environmental factors substantially influence customer satisfaction in dining contexts.

The moderating effects of gender on the relationships between lighting, ambience, and layout with consumer satisfaction were examined through interaction terms. The beta coefficients were negative for Gender \times Lighting ($\beta = -0.233$, $p = 0.082$) and Gender \times Ambience ($\beta = -0.180$, $p = 0.257$), while Gender \times Layout showed a positive but non-significant coefficient ($\beta = 0.089$, $p = 0.531$). None of these interaction effects reached statistical significance at the 0.05 level. These results indicate that gender does not significantly moderate the impact of physical environment factors on consumer satisfaction.

Table 4: Moderating effect of Gender

Model	S.E.	β	t-value	p-value
Gender*lighting	-0.233	0.134	-1.746	0.082
Gender *ambiance	-0.18	0.159	-1.134	0.257
Gender*layout	0.089	0.142	0.628	0.531

Discussions

This study examined how the physical environment influences consumer satisfaction in fast-food restaurants, while also assessing the moderating role of gender. Grounded in the S-O-R theory, the findings affirm the theory's applicability within the Nepalese hospitality context, demonstrating that sensory and environmental stimuli significantly shape consumers' emotional states and subsequent satisfaction (Mehrabian & Russell, 1974).

The regression analysis revealed that layout is the strongest predictor of consumer satisfaction, followed by ambience and lighting. This hierarchy suggests that spatial organization and facility arrangement are paramount in shaping customer experiences, consistent with previous findings emphasizing spatial design's role in enhancing comfort and emotional connection in dining environments (Namkung & Jang, 2008; Tuzunkan & Albayrak, 2016). Ambience's significant effect aligns with Bitner's (1992) assertion that atmosphere directly impacts customer evaluations, while lighting's positive influence resonates with Ryu and Han (2011), who noted lighting as a key atmospheric element.

However, some prior studies report mixed results regarding lighting's influence on satisfaction (Ryu, 2005; Tuver et al., 2018), highlighting contextual factors such as cultural differences or restaurant types as potential moderators. Similarly, although ambience positively correlated with satisfaction in this study, contrasting findings by Han and Ryu (2009) suggest that ambience's effect may vary based on consumer expectations and dining purpose.

Interestingly, the moderating role of gender was not supported, as all interaction terms between gender and physical environment variables were non-significant. This indicates that male and female consumers similarly perceive and value ambience, layout, and lighting when evaluating their dining experience. This finding suggests that physical environmental strategies need not be differentiated by gender,

streamlining managerial focus on universally impactful environmental factors.

Conclusion and Implications

This study concludes that the physical environment, particularly layout, ambience, and lighting, significantly influences consumer satisfaction in Kathmandu's fast-food restaurants. Among these factors, layout emerged as the most influential predictor, highlighting the critical importance of spatial arrangement and facility organization in enhancing the overall dining experience. Ambience and lighting also demonstrated positive and statistically significant effects, reinforcing the notion that sensory elements collectively contribute to customer comfort, emotional engagement, and satisfaction.

The findings align with the S-O-R model, confirming that well-designed environmental stimuli evoke favorable emotional responses in consumers, which in turn influence satisfaction and potentially loyalty. Importantly, the study reveals that gender does not moderate the relationship between physical environment factors and consumer satisfaction. This suggests that male and female consumers alike value these environmental attributes similarly, allowing restaurant managers to adopt uniform environmental strategies without the need for gender-specific customization.

Similarly, fast-food restaurants aiming to improve customer satisfaction and encourage repeat visits should prioritize optimizing their spatial layout while also carefully managing ambience and lighting. These environmental elements not only enhance the aesthetic appeal of the venue but also create a comfortable and inviting atmosphere that positively influences consumer perceptions. This study expands the atmospherics literature by providing empirical evidence from the Nepalese hospitality context, enhancing the generalizability of the S-O-R model. It confirms that physical environment elements such as layout, lighting, and ambience play a crucial role in shaping consumer emotions and satisfaction, reinforcing the importance of sensory and spatial cues in consumer behavior.

For practitioners, the findings emphasize the need for holistic management of the physical environment in fast-food restaurants. Prioritizing an inviting, well-organized layout alongside appropriate lighting and ambience can significantly enhance the dining experience and customer satisfaction. Since gender does not moderate these effects, restaurants can adopt uniform environmental strategies across all customer segments. Restaurant managers are encouraged to invest in interior design, lighting, décor, and cleanliness while regularly collecting customer feedback to identify and address areas for improvement. Adjusting the atmosphere to meet evolving customer preferences can sustain interest and encourage repeat visits.

From a policy perspective, establishing minimum standards for physical environments in hospitality venues can promote healthier, more comfortable dining spaces, supporting consumer well-being.

Limitations and Further Research

Future studies could broaden the scope by incorporating additional environmental dimensions, such as noise levels, scent, or temperature, to comprehensively capture the multisensory dining experience. Investigating the interplay between price perceptions and physical environment could also elucidate how economic factors interact with sensory stimuli to shape satisfaction.

Moreover, exploring social environmental influences (such as staff behavior or crowding) and their combined effects with physical factors on satisfaction can deepen understanding. Further research on potential moderators beyond gender, including age, culture, or dining purpose, would provide nuanced insights into consumer heterogeneity. Finally, employing longitudinal designs or experimental methods could clarify causal relationships and the temporal stability of these effects, advance theory, and guide more effective restaurant management practices.

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Conflict of Interest

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Ethical statement

This study did not require ethical approval as it involved no human or animal subjects; however, the authors affirm its originality and adherence to established research ethics and standards.

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