

Sensory Marketing and Brand Loyalty: The Mediating Role of Emotional Attachment in Shopping Malls

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Abstract

This study examines the influence of sensory marketing cues on brand loyalty through the mediating role of emotional attachment in shopping malls. Grounded in the Stimulus-Organism-Response (S-O-R) framework, the study also investigates the moderating effects of age and gender on the relationship between sensory marketing cues and emotional attachment. A quantitative cross-sectional survey was conducted among 397 shopping mall consumers in Kathmandu Valley, Nepal. Data were analyzed using partial least squares structural equation modeling (PLS-SEM). The findings reveal that sensory marketing cues significantly enhance both emotional attachment and brand loyalty. Emotional attachment partially mediates the relationship between sensory marketing cues and brand loyalty, confirming that consumers' emotional responses constitute an important mechanism through which multisensory experiences foster loyalty. Among the five sensory dimensions, olfactory and visual cues make the strongest contribution to the overall sensory marketing experience. The results further show that age significantly moderates the relationship between sensory marketing cues and emotional attachment, whereas gender does not. The study extends the application of the S-O-R framework to a multi-brand shopping mall environment and demonstrates the effectiveness of integrated sensory experiences in strengthening consumer-brand relationships. The findings also provide practical guidance for retailers and shopping mall managers in designing emotionally engaging and age-responsive sensory marketing strategies.

Keywords: sensory marketing cues, emotional attachment, brand loyalty, shopping malls, S-O-R framework

Introduction

In an increasingly competitive retail landscape, firms are seeking to differentiate themselves by delivering memorable customer experiences rather than competing solely

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on product attributes or price. As consumers become more informed and retail competition intensifies, organizations are shifting from traditional transactional marketing toward experiential strategies that stimulate consumers' senses and foster meaningful emotional connections with brands. Sensory marketing has consequently emerged as an important strategic approach that deliberately engages consumers' visual, auditory, olfactory, tactile, and gustatory senses to shape perceptions, evoke emotions, and influence purchasing behavior (Krishna, 2012; Rodríguez-Ulcuango et al., 2025). By transforming shopping into an immersive experience, sensory marketing enables firms to differentiate their brands in highly competitive retail environments and cultivate long-term customer relationships.

Shopping malls provide one of the most comprehensive environments for implementing sensory marketing because consumers are simultaneously exposed to multiple atmospheric cues throughout their shopping journey. Store architecture, lighting, digital displays, background music, fragrances, product textures, and food-related experiences collectively create a multisensory environment that influences consumers' cognitive evaluations and emotional responses. Unlike online retailing or traditional marketplaces, shopping malls offer marketers greater control over these environmental stimuli, allowing them to design holistic customer experiences that encourage longer visits, higher spending, and repeat patronage (Shahid et al., 2022; Spence et al., 2014). As modern shopping malls increasingly evolve into lifestyle and entertainment destinations rather than merely purchasing venues, understanding how integrated sensory experiences influence consumer behavior has become strategically important for retailers and brand managers.

Among the various psychological outcomes of sensory experiences, emotional attachment has received growing attention because it represents a deep emotional bond between consumers and brands developed through meaningful and memorable interactions. Consumers who become emotionally attached to a brand are more likely to exhibit stronger trust, commitment, positive word-of-mouth, and repeat purchasing behavior, making emotional attachment a critical antecedent of brand loyalty (Park et al., 2010). Recent studies further suggest that sensory experiences enhance consumers' emotional engagement and subsequently strengthen loyalty toward brands. For example, Shahid et al. (2022) demonstrated that sensory marketing cues positively influence emotional attachment and brand loyalty in luxury retail settings, while Gao and Shen (2024) found that sensory brand experiences promote loyalty both directly and indirectly through psychological mechanisms. Collectively, these findings suggest that emotional attachment may represent an important mechanism through which multisensory experiences are translated into enduring customer relationships.

Despite the rapid growth of sensory marketing research, several important gaps remain. First, previous studies have frequently examined individual sensory dimensions, such as visual merchandising, music, or scent, independently, although consumers naturally experience these sensory cues simultaneously within retail environments (Krishna, 2012; Spence et al., 2014). Consequently, relatively little empirical evidence exists regarding the cumulative influence of integrated multisensory experiences on consumer behavior in shopping malls. Second, although prior studies have established positive relationships between sensory marketing and favorable consumer outcomes, the psychological processes through which sensory experiences generate brand loyalty remain insufficiently understood. Existing research has largely emphasized customer satisfaction, brand experience, or brand attitude as mediating mechanisms, whereas comparatively fewer studies have investigated the mediating role of emotional attachment (Gao & Shen, 2024; Zha et al., 2024). Third, consumer responses to sensory stimuli may vary across demographic groups. Prior research suggests that age and gender influence emotional processing and sensory perception; however, empirical findings remain inconclusive, particularly within emerging retail markets (Gao & Shen, 2024). These gaps indicate the need for a more comprehensive investigation that simultaneously considers multisensory experiences, emotional attachment, and demographic differences within a unified theoretical framework.

The present study addresses these gaps by drawing on the Stimulus-Organism-Response (S-O-R) theory (Mehrabian & Russell, 1974), which explains how environmental stimuli influence consumers' internal psychological states that subsequently determine behavioral responses. Within the context of shopping malls, multisensory marketing cues constitute the environmental stimuli (Stimulus), emotional attachment represents the consumers' internal affective state (Organism), and brand loyalty reflects the behavioral response (Response). The S-O-R framework therefore provides a robust theoretical foundation for explaining how multisensory retail experiences are transformed into enduring consumer-brand relationships. Furthermore, recognizing that consumers differ in their perception and processing of sensory information, this study extends the S-O-R framework by incorporating age and gender as moderating variables. Previous studies suggest that demographic characteristics shape sensory perception, emotional processing, and decision-making; however, empirical evidence regarding their moderating roles remains limited and inconclusive, particularly in shopping mall settings (Gao & Shen, 2024; Huaman-Ramirez & Merunka, 2019).

Against this background, this study investigates the influence of sensory marketing on brand loyalty through the mediating role of emotional attachment among consumers visiting shopping malls in Kathmandu Valley, Nepal. Sensory marketing is

conceptualized as a higher-order construct comprising visual, auditory, olfactory, tactile, and gustatory dimensions. In addition, the study examines whether age and gender moderate the relationship between sensory marketing and emotional attachment, thereby providing a more nuanced understanding of consumer heterogeneity in multisensory retail environments. By integrating mediation and moderation within a single conceptual framework, this research makes three important contributions. First, it advances the sensory marketing literature by conceptualizing sensory marketing as an integrated multisensory construct rather than examining individual sensory dimensions in isolation. Second, it extends the application of the S-O-R framework by demonstrating the mediating role of emotional attachment in translating sensory experiences into brand loyalty while simultaneously accounting for demographic heterogeneity through the moderating effects of age and gender. Finally, the findings offer practical insights for shopping mall managers and retailers seeking to design differentiated sensory experiences for diverse consumer segments, thereby strengthening emotional attachment and fostering sustainable brand loyalty.

Literature Review and Hypothesis Development

Theoretical Foundation. The S-O-R theory, originally developed by Mehrabian and Russell (1974), provides a theoretical framework for understanding how environmental stimuli influence consumers' internal psychological states and subsequent behavioral responses. The theory posits that external environmental stimuli do not directly determine consumer behavior; instead, they first evoke consumers' cognitive and affective reactions, which subsequently shape behavioral outcomes. Owing to its strong explanatory power, the S-O-R framework has been extensively applied in retailing, services marketing, tourism, and consumer behavior research to understand how store atmospherics and consumption environments influence customer experiences and behavioral intentions.

The increasing adoption of sensory marketing has further expanded the application of the S-O-R framework. Sensory marketing cues—including visual, auditory, olfactory, tactile, and gustatory stimuli—constitute environmental stimuli that shape consumers' perceptions and emotions during shopping experiences (Krishna, 2012; Spence et al., 2014). In shopping malls, these cues are deliberately integrated through architectural design, lighting, music, ambient scents, product displays, and food-related experiences to create immersive consumption environments. Previous studies suggest that such multisensory experiences enhance consumers' emotional engagement, strengthen brand evaluations, and ultimately influence post-purchase behaviors, including loyalty (Gao & Shen, 2024; Shahid et al., 2022).

Consistent with the S-O-R framework, this study conceptualizes sensory marketing cues (SMC) as the environmental stimulus, emotional attachment as the organism, and brand loyalty as the response. Emotional attachment represents consumers' affective connection with a brand that develops through repeated positive experiences and serves as the psychological mechanism linking sensory experiences with enduring behavioral outcomes (Park et al., 2010). Brand loyalty, reflected in consumers' commitment to repurchase and recommend a preferred brand, constitutes the ultimate behavioral response resulting from positive emotional experiences. This conceptualization provides a theoretically coherent explanation of how multisensory shopping experiences are transformed into long-term consumer–brand relationships.

Although the S-O-R framework explains the fundamental mechanism linking environmental stimuli and behavioral responses, consumers may not respond uniformly to identical sensory experiences. Individual characteristics can influence the perception and interpretation of environmental cues, thereby affecting subsequent emotional responses. Among these characteristics, gender and age have been identified as important demographic factors associated with differences in sensory perception, emotional processing, and shopping behavior. Consequently, this study extends the traditional S-O-R framework by proposing that gender and age moderate the relationship between sensory marketing cues and emotional attachment.

Hypothesis Development.

Sensory Marketing Cues and Emotional Attachment. Sensory marketing cues create immersive shopping experiences by stimulating consumers' visual, auditory, olfactory, tactile, and gustatory senses. Rather than merely conveying product information, these cues evoke emotional responses that shape consumers' perceptions of brands and retail environments (Krishna, 2012). According to the Stimulus–Organism–Response (S-O-R) theory, environmental stimuli first influence consumers' internal affective states before generating behavioral responses (Mehrabian & Russell, 1974). Accordingly, sensory marketing cues serve as environmental stimuli that foster emotional attachment by creating enjoyable, memorable, and personally meaningful shopping experiences.

Empirical evidence supports this relationship. Sensory-rich retail environments strengthen consumers' emotional engagement and attachment to brands by enhancing experiential value and affective responses (Gao & Shen, 2024; Shahid et al., 2022; Rodríguez-Ulcuango et al., 2025). Therefore, consumers who perceive richer sensory experiences are expected to develop stronger emotional attachment toward brands.

H1: *Sensory marketing cues positively influence emotional attachment.*

Emotional Attachment and Brand Loyalty. Emotional attachment reflects a strong affective bond that develops through repeated positive interactions with a brand and encourages consumers to maintain long-term relationships (Park et al., 2010). Within the S-O-R framework, emotional attachment represents the organism through which favorable shopping experiences are translated into behavioral responses. Consumers who develop stronger emotional attachment are more likely to repurchase, recommend the brand, and remain loyal despite competing alternatives.

Prior studies consistently identify emotional attachment as an important antecedent of brand loyalty across retail settings (Gao & Shen, 2024; Park et al., 2010; Shahid et al., 2022). Accordingly, emotional attachment is expected to positively influence consumers' loyalty toward brands operating in shopping malls.

H2: *Emotional attachment positively influences brand loyalty.*

Sensory Marketing Cues and Brand Loyalty. Beyond influencing consumers through emotional attachment, sensory marketing cues may directly enhance brand loyalty by creating memorable shopping experiences that improve brand evaluations and customer satisfaction (Krishna, 2012). Positive multisensory experiences strengthen consumers' preference for a brand and increase their intention to revisit and repurchase.

Empirical evidence likewise demonstrates that integrated sensory marketing strategies positively influence customer loyalty by enriching the overall shopping experience (Rodríguez-Ulcuango et al., 2025; Shahid et al., 2022). Therefore, sensory marketing cues are expected to exert a direct positive influence on brand loyalty.

H3: *Sensory marketing cues positively influence brand loyalty.*

Mediating Role of Emotional Attachment. The S-O-R framework suggests that environmental stimuli affect behavioral responses primarily through consumers' internal psychological states. Accordingly, sensory marketing cues are expected to enhance brand loyalty by first strengthening consumers' emotional attachment. Prior studies indicate that emotionally engaging sensory experiences create stronger consumer–brand relationships that subsequently foster loyalty (Gao & Shen, 2024; Park et al., 2010). Therefore, emotional attachment is expected to mediate the relationship between sensory marketing cues and brand loyalty.

H4: *Emotional attachment mediates the relationship between sensory marketing cues and brand loyalty.*

Moderating Roles of Age and Gender. The effectiveness of sensory marketing cues may vary across consumer groups because individuals differ in how they perceive and

emotionally respond to environmental stimuli. The S-O-R framework suggests that such individual differences influence the relationship between environmental stimuli and internal psychological states. Previous studies indicate that women generally exhibit greater sensitivity to sensory and atmospheric cues than men, while consumers of different age groups vary in sensory perception, shopping motivations, and experiential preferences (Gao & Shen, 2024; Krishna, 2012). Consequently, gender and age are expected to moderate the relationship between sensory marketing cues and emotional attachment.

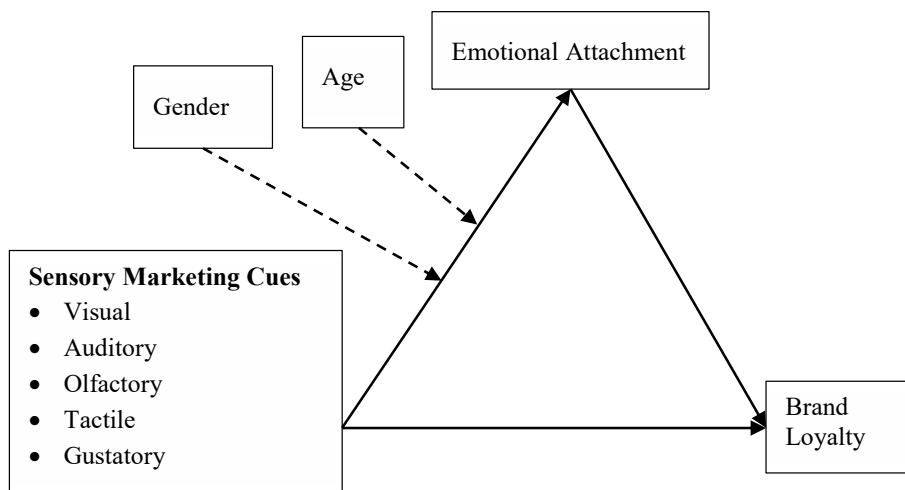
H5: *Gender moderates the relationship between sensory marketing cues and emotional attachment such that the positive relationship differs between male and female consumers.*

H6: *Age moderates the relationship between sensory marketing cues and emotional attachment such that the positive relationship varies across different age groups.*

The proposed hypotheses are integrated into the conceptual research model presented in Figure 1, which illustrates the direct, mediating, and moderating relationships examined in this study.

Figure 1

Conceptual Framework of the Study



Methods

This paper employed explanatory, cross-sectional survey design to examine the relationships among sensory marketing cues, emotional attachment, and brand loyalty in shopping mall environments. A survey approach was considered appropriate because the study investigates consumers' perceptions and experiences of naturally occurring sensory stimuli without manipulating the shopping environment. The target population comprised consumers who had prior shopping experience in shopping malls. Primary data were collected using a structured self-administered questionnaire distributed online through Google Forms. A purposive sampling technique was adopted to ensure that respondents had sufficient exposure to shopping mall environments and were capable of evaluating sensory marketing cues encountered during their shopping experiences. Prior to the main survey, the questionnaire was pre-tested with a small group of shopping mall visitors to assess item clarity, wording, and content validity. Minor revisions were subsequently made to improve readability and contextual relevance. A total of 397 usable questionnaires were retained for analysis after data screening.

The measurement instrument comprised previously validated multi-item scales adapted from established studies to ensure content validity and theoretical consistency. Following the conceptualization of Zha et al. (2024), sensory marketing cues (SMC) were operationalized as a reflective-reflective higher-order construct consisting of five first-order dimensions: visual, auditory, olfactory, tactile, and gustatory cues. Emotional attachment was measured using six items adapted from Zha et al., while brand loyalty was measured using established scales adapted from Nadiri and Günay (2011). Minor modifications to item wording were made to reflect the shopping mall context without altering the conceptual meaning of the original measures. All constructs were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The conceptual definitions, number of measurement items, and corresponding literature sources for each construct are summarized in Table 1.

Data analysis was conducted using IBM SPSS Statistics and SmartPLS 4.0. SPSS was employed for preliminary data screening, descriptive statistics, and assessment of missing values and common method bias. The hypothesized relationships were subsequently examined using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was selected because it is well suited for predicting complex relationships involving higher-order constructs, mediation, and moderation while imposing minimal distributional assumptions (Hair et al., 2019).

Table 1

Measurement of Constructs

Construct	Definition	Items	Source
Visual sensory cues	Consumers' perceptions of visual elements such as lighting, colour, layout, design, and visual displays within the shopping mall.	5	Zha et al. (2024)
Auditory sensory cues	Consumers' perceptions of sound-related stimuli, including background music and ambient sounds.	6	Zha et al. (2024)
Olfactory sensory cues	Consumers' perceptions of ambient fragrances and scents experienced within the shopping mall.	5	Zha et al. (2024)
Tactile sensory cues	Consumers' perceptions of touch-related stimuli such as texture, material quality, and physical interaction with products.	5	Zha et al. (2024)
Gustatory sensory cues	Consumers' perceptions of taste-related experiences available within the shopping mall environment.	5	Zha et al. (2024)
Emotional attachment	Consumers' affective bond and psychological connection with brands experienced within the shopping mall.	6	Zha et al. (2024)
Brand loyalty	Consumers' commitment to repurchase, recommend, and maintain long-term relationships with preferred brands.	6	Nadiri & Günay (2011)

Following the two-step analytical procedure recommended by Hair et al. (2022), the measurement model was first evaluated by examining indicator reliability, internal consistency reliability (Cronbach's alpha and composite reliability), convergent validity using the average variance extracted (AVE), and discriminant validity using the Heterotrait–Monotrait ratio (HTMT) and Fornell Larcker's Test. Subsequently, the structural model was assessed by estimating path coefficients, coefficients of determination (R^2), predictive relevance (Q^2), effect sizes (f^2), and collinearity diagnostics. The statistical significance of the hypothesized relationships was determined using the bootstrapping procedure with 5,000 resamples. The mediating role of emotional attachment was examined through the assessment of indirect effects using the bootstrapping approach, while the moderating effects of age and gender were evaluated using interaction-term analysis in SmartPLS 4.0. The higher-order construct of sensory

marketing cues was estimated as a reflective-reflective hierarchical component model using the repeated indicators approach following the recommendations of Hair et al. (2022).

Because data for all constructs were collected from the same respondents using a single questionnaire, common method bias (CMB) was assessed prior to hypothesis testing. First, Harman's single-factor test was performed using principal axis factoring through IBM SPSS software version 25. The first unrotated factor explained 42.08% of the total variance, which is below the recommended threshold of 50%, indicating that common method bias is unlikely to be a serious concern (Aguirre-Urreta & Hu, 2019; Podsakoff et al., 2003). To further verify this result, the full collinearity assessment proposed by Kock (2015) was conducted (Table 2). All inner variance inflation factor (VIF) values were below the recommended threshold of 3.3, suggesting that neither vertical nor lateral collinearity was present. Collectively, these findings indicate that common method bias is unlikely to threaten the validity of the study's results.

Table 2

Full Collinearity Assessment

Construct	Emotional Attachment	Brand Loyalty
Age*	1.334	
Gender*	1.05	
EA**		1.956
SMC***	1.636	1.956
AS	2.233	2.255
GS	1.767	2.267
OS	3.053	3.036
TS	2.556	2.612
VS	2.28	2.368

Note. * Moderating variables; ** Mediating variable; *** Sensory Marketing Cue (Higher order construct)

Results

Sample Demographic

In this study, out of the 397 respondents, 53.9% were male and 46.1% were female, indicating a relatively balanced gender distribution. In terms of age, nearly half (48.1%) were aged 25–34 years, followed by 24.2% aged 18–24 years, suggesting that the sample was predominantly young. Regarding education, 48.4% held a Master's degree and

38.8% a Bachelor's degree, indicating a highly educated sample. By occupation, college students constituted the largest group (34.0%), followed by private-sector employees (26.7%) and self-employed respondents (24.2%). Regarding frequency of visits, the largest proportion (26.2%) visited a few times a year, while 20.2% visited monthly. Finally, 50.9% of respondents spent 1–2 hours per visit in shopping malls, followed by 29.2% who spent less than one hour. The details are shown in Table 3.

Table 3
Demographics of Respondents

Group	N	Percent	Group	N	Percent
Gender			Education		
Male	214	53.9	+2/ Intermediate	28	7.1
Female	183	46.1	Bachelor	154	38.8
Age			Masters	192	48.4
18-24	96	24.2	Above Masters	23	5.8
25-34	191	48.1	Frequency		
35-45	65	16.4	Frequently	74	18.6
45-54	36	9.1	Weekly	54	13.6
Above 55	9	2.3	Twice a Month	56	14.1
Occupation			Monthly	80	20.2
Private job	106	26.7	Few times a year	104	26.2
Self Employed	96	24.2	Rarely	29	7.3
College Student	135	34	Average Time Spent		
Government Job	50	12.6	Less than 1 hour	116	29.2
Unemployed	10	2.5	1-2 hours	202	50.9
			2-4 hours	70	17.6
			More than 4 hours	9	2.3

Note. N = 397

Measurement Model Assessment

The measurement model was evaluated by examining indicator reliability, internal consistency reliability, convergent validity, and the hierarchical component model of sensory marketing cues following Hair et al (2017) and Hair et al (2019). Prior to the final assessment of the measurement model, three indicators (AS5, TS1, and EA1) were removed because their outer loadings were below the recommended threshold of 0.708.

Eliminating these indicators improved the reliability and convergent validity of the corresponding constructs while preserving their conceptual content as shown in Table 4..

Table 4

Constructs, Outer Loadings, Validity, Reliability, and Collinearity

Constructs	Indicator	Factor Loading	VIF	Cronbach Alpha	Composite Reliability	AVE
Tactile Sensory Cues	TS2	0.895	3.019	0.879	0.887	0.68
	TS3	0.859	2.509			
	TS4	0.858	2.274			
	TS5	0.883	2.398			
Olfactory Sensory Cues	OS1	0.842	2.338	0.879	0.883	0.676
	OS2	0.88	2.941			
	OS3	0.849	2.593			
	OS4	0.785	1.869			
	OS5	0.739	1.64			
Gustatory Sensory Cues	GS1	0.817	2.265	0.836	0.851	0.604
	GS2	0.835	2.793			
	GS3	0.71	1.714			
	GS4	0.813	2.039			
	GS5	0.704	1.712			
Visual Sensory Cues	VS1	0.725	1.693	0.83	0.835	0.596
	VS2	0.842	2.479			
	VS3	0.812	2.322			
	VS4	0.688	1.265			
	VS5	0.782	1.768			
Auditory Sensory Cues	AS1	0.769	1.704	0.847	0.879	0.575
	AS2	0.894	3.096			
	AS3	0.782	1.949			
	AS4	0.813	2.281			
	AS6	0.767	1.735			
Emotional Attachment	EA2	0.787	2.383	0.846	0.864	0.572
	EA3	0.817	2.663			
	EA4	0.81	1.88			
	EA5	0.73	1.621			
	EA6	0.847	2.224			
Brand Loyalty	BL1	0.897	3.734	0.913	0.867	0.619
	BL2	0.85	3.161			
	BL3	0.854	2.699			
	BL4	0.833	2.561			
	BL5	0.864	3.516			
	BL6	0.711	2.203			
Sensory Marketing Cue (Higher Order Construct)	AS	0.808	2.186	0.891	0.92	0.697
	GS	0.78	1.811			
	OS	0.899	3.359			
	TS	0.87	2.829			
	VS	0.813	2.18			

All retained indicators demonstrated satisfactory outer loadings, ranging from 0.688 to 0.899 for the first-order constructs. Although a few indicators exhibited loadings slightly below the preferred threshold of 0.70, they exceeded the minimum acceptable level and were retained because the corresponding constructs demonstrated satisfactory composite reliability and convergent validity. Cronbach's alpha values ranged from 0.830 to 0.913, while composite reliability values ranged from 0.835 to 0.920, exceeding the recommended threshold of 0.70, confirms the model's reliability. Likewise, convergent validity was established, as the average variance extracted (AVE) values ranged from 0.572 to 0.697, indicating that each construct explained more than 50% of the variance in its indicators. In addition, indicator-level collinearity was not considered problematic, with VIF values remaining below the recommended threshold of 5.0.

Because sensory marketing cues were conceptualized as a reflective-reflective higher-order construct, an additional assessment was conducted to examine the contribution of its five lower-order dimensions. As presented in Table 5, all lower-order constructs loaded positively and significantly on the higher-order construct ($\beta = 0.780\text{--}0.899$, $p < 0.001$), providing strong empirical support for the hierarchical measurement model. Among the five sensory dimensions, olfactory sensory cues exhibited the strongest contribution to the higher-order construct (loading = 0.899; weight = 0.216), followed by visual sensory cues, auditory sensory cues, tactile sensory cues, and gustatory sensory cues. Furthermore, all path coefficients were highly significant ($t = 34.052\text{--}73.269$, $p < 0.001$), and the confidence intervals excluded zero, confirming the statistical significance of each lower-order construct. These findings confirm the reflective-reflective structure of the Sensory Marketing Cues construct and validate its operationalization as a multidimensional higher-order construct composed of distinct yet interrelated factors comprised of sensory marketing.

Table 5

Higher-Order Construct Assessment of Sensory Marketing

Lower-Order Component	Loading on HOC	VIF	t-value	p-value	95% CI Lower	95% CI Upper	Contribution Weight
Tactile Sensory	0.808	2.83	63.73	0	0.842	0.895	0.1938
Gustatory Sensory	0.78	1.81	34.052	0	0.731	0.821	0.1871
Olfactory Sensory	0.899	3.36	73.269	0	0.872	0.921	0.2156
Visual Sensory	0.87	2.18	38.914	0	0.769	0.852	0.2086
Auditory Sensory	0.813	2.19	36.499	0	0.761	0.849	0.195

Discriminant Validity Assessment

Discriminant validity was assessed using the Heterotrait–Monotrait (HTMT) ratio and the Fornell–Larcker criterion. As shown in Table 6, all HTMT values ranged from 0.553 to 0.816, remaining below the recommended threshold of 0.85 (Hair et al., 2019). These results indicate that the first-order constructs are empirically distinct despite their conceptual relatedness. The results of the Fornell–Larcker criterion (Table 7) further support discriminant validity. For each construct, the square root of the average variance extracted (AVE), presented on the diagonal of the correlation matrix, exceeded its correlations with all other constructs. This demonstrates that each construct shares greater variance with its own indicators than with other latent variables in the model. Hence, the findings from both the HTMT ratio and the Fornell–Larcker criterion confirm that the measurement model possesses satisfactory discriminant validity, indicating that the first-order constructs represent distinct theoretical concepts and provide a sound basis for subsequent structural model analysis.

Table 6
Heterotrait–Monotrait (HTMT) Ratio

	AS	BL	EA	GS	OS	TS	VS
AS							
BL	0.65						
EA	0.59	0.81					
GS	0.58	0.67	0.79				
OS	0.82	0.76	0.66	0.74			
TS	0.63	0.68	0.64	0.58	0.8		
VS	0.7	0.68	0.64	0.55	0.73	0.8	

Table 7
Fornell–Larcker Criterion

	AS	BL	EA	GS	OS	TS	VS
AS	0.81						
BL	0.59	0.84					
EA	0.52	0.73	0.8				
GS	0.5	0.59	0.68	0.78			
OS	0.71	0.68	0.58	0.65	0.82		
TS	0.57	0.62	0.57	0.53	0.72	0.87	
VS	0.62	0.6	0.57	0.49	0.64	0.69	0.77

Structural Model Assessment

Direct and Mediating Effects. The structural relationships among sensory marketing cues (SMC), emotional attachment (EA), and brand loyalty (BL) were examined using the bootstrapping procedure. As shown in Table 8 and Figure 2, sensory marketing cues exerted a significant positive effect on emotional attachment ($\beta = 0.699$, $t = 26.658$, $p < 0.001$), indicating that richer sensory experiences substantially strengthen consumers' emotional attachment toward shopping malls. Likewise, emotional attachment had a significant positive influence on brand loyalty ($\beta = 0.419$, $t = 9.010$, $p < 0.001$), suggesting that emotionally attached consumers are more likely to remain loyal.

Sensory marketing cues also had a significant direct effect on brand loyalty ($\beta = 0.443$, $t = 9.942$, $p < 0.001$). Furthermore, the indirect effect of sensory marketing cues on brand loyalty through emotional attachment was positive and statistically significant ($\beta = 0.293$, $t = 9.710$, $p < 0.001$), with the 95% confidence interval excluding zero. Since both the direct and indirect effects remained significant, emotional attachment partially mediates the relationship between sensory marketing cues and brand loyalty. The total effect of sensory marketing cues on brand loyalty was also strong and significant ($\beta = 0.7376$, $t = 28.586$, $p < 0.001$), highlighting the substantial role of sensory marketing in fostering customer loyalty.

Figure 2

Structural Model of Mediation Analysis

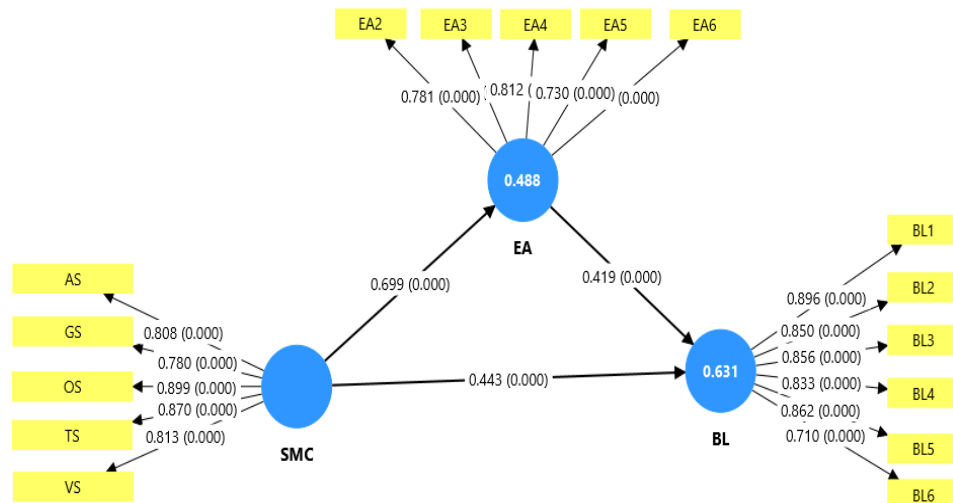


Table 8*Mediation Analysis*

	Beta	STDEV	T statistics	P-values	2.50%	97.5%
Indirect Effect						
SMC -> EA -> BL	0.293	0.030	9.7100	0.000	0.231	0.351
Direct Effect						
SMC -> BL	0.443	0.045	9.9420	0.000	0.356	0.534
SMC -> EA	0.699	0.026	26.658	0.000	0.648	0.750
EA -> BL	0.419	0.046	9.0100	0.000	0.321	0.509
Total Effect	0.736	0.026	28.586	0.000	0.684	0.786

Moderating Effects. The moderating effects of age and gender on the relationship between sensory marketing cues and emotional attachment are presented in Table 9 and Figure 3. The direct effect of age on emotional attachment was not statistically significant ($\beta = -0.013$, $t = 0.474$, $p = 0.636$), indicating that consumers' age alone does not significantly influence emotional attachment. However, the interaction between age and sensory marketing cues was significant and negative ($\beta = -0.119$, $t = 5.878$, $p < 0.001$), suggesting that the positive effect of sensory marketing cues on emotional attachment weakens as consumers become older. This finding indicates that younger consumers are more responsive to sensory marketing experiences than older consumers.

In contrast, gender exhibited a significant direct effect on emotional attachment ($\beta = 0.315$, $t = 4.612$, $p < 0.001$), indicating differences in the overall level of emotional attachment between male and female consumers. However, the interaction between gender and sensory marketing cues was not statistically significant ($\beta = 0.003$, $t = 0.050$, $p = 0.960$), suggesting that gender does not alter the influence of sensory marketing cues on emotional attachment. Consequently, while gender is associated with emotional attachment, it does not moderate the relationship between sensory marketing cues and emotional attachment.

The direct effects of sensory marketing cues on emotional attachment ($\beta = 0.728$, $p < 0.001$) and brand loyalty ($\beta = 0.443$, $p < 0.001$), together with the effect of emotional attachment on brand loyalty ($\beta = 0.419$, $p < 0.001$), remained significant after including the moderating variables, demonstrating the robustness of the proposed structural relationships.

Figure 3

Structural Model of Moderation Analysis

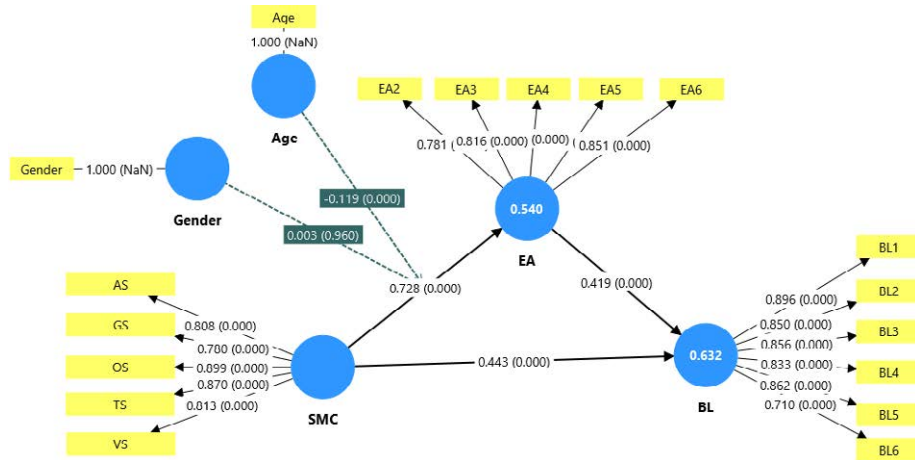


Table 9

Moderation Analysis

Path	Beta	STDEV	T statistics	P values	2.50%	97.50%
Age → EA	-0.010	0.026	0.474	0.636	-0.067	0.038
Gender → EA	0.315	0.068	4.612	0.000	0.181	0.451
Age x SMC → EA	-0.120	0.02	5.878	0.000	-0.159	-0.080
Gender x SMC → EA	0.003	0.067	0.050	0.960	-0.132	0.130
SMC → EA	0.728	0.037	19.708	0.000	0.655	0.800
EA → BL	0.419	0.047	9.019	0.000	0.322	0.509
SMC → BL	0.443	0.045	9.914	0.000	0.355	0.534

Explanatory Power and Predictive Relevance

The explanatory power and predictive relevance of the structural model were evaluated using the coefficient of determination (R^2), Stone–Geisser's predictive relevance (Q^2), and effect size (f^2). As reported in Table 10, the model explained 54.6% of the variance in emotional attachment ($R^2 = 0.546$) and 63.5% of the variance in brand loyalty ($R^2 = 0.635$), indicating moderate to substantial explanatory power.

The model also demonstrated satisfactory predictive relevance, with Q^2 values of 0.501 for emotional attachment and 0.533 for brand loyalty, both exceeding zero. These findings indicate that the model possesses adequate predictive capability. Regarding effect sizes, sensory marketing cues alone had a large effect on emotional attachment ($f^2 = 0.722$) and a moderate effect on brand loyalty ($f^2 = 0.280$), while emotional attachment had a moderate effect on brand loyalty ($f^2 = 0.250$). The interaction effect of age $\times$ sensory marketing cues on emotional attachment was relatively small ($f^2 = 0.035$), whereas the interaction effect of gender $\times$ sensory marketing cues ($f^2 = 0.002$) and the direct effect of age on emotional attachment ($f^2 = 0.001$) was negligible, while gender exhibited a small effect ($f^2 = 0.054$). Overall, these results indicate that sensory marketing cues are the primary driver of emotional attachment and brand loyalty, whereas age plays a modest moderating role and gender does not significantly affect the relationship between sensory marketing cues and emotional attachment.

Table 10

Results of R^2 and predictive relevance Q^2

	R2	Q^2 predict	F-square (BL as DV)	F-square (EA as DV)
EA	0.546	0.501	0.250	
BL	0.635	0.533		
SMC			0.280	0.722
Age				0.001
Age x SMC				0.035
Gender				0.054
Gender x SMC				0.002

Summary of Hypothesis Testing

The results of hypothesis testing are summarized in Table 11. The findings support H1, H2, and H3, indicating that sensory marketing cues positively influence emotional attachment and brand loyalty, while emotional attachment significantly enhances brand loyalty. The mediation analysis further confirms that emotional attachment partially mediates the relationship between sensory marketing cues and brand loyalty, supporting H4. Regarding the moderating effects, age significantly moderates the relationship between sensory marketing cues and emotional attachment, supporting H6, whereas the moderating effect of gender is not significant, leading to the rejection of H5. Overall,

five of the six proposed hypotheses were supported, providing substantial empirical support for the proposed research model.

Table 11

Summary of Hypothesis Testing

Hypothesis	Path	β	t-value	p-value	Decision
H1	SMC $\rightarrow$ EA	0.701	26.658	<0.001	Supported
H2	EA $\rightarrow$ BL	0.418	9.010	<0.001	Supported
H3	SMC $\rightarrow$ BL	0.445	9.942	<0.001	Supported
H4	SMC $\rightarrow$ EA $\rightarrow$ BL	0.293	9.710	<0.001	Supported (Partial Mediation)
H5	Gender $\times$ SMC $\rightarrow$ EA	0.000	0.050	0.960	Not Supported
H6	Age $\times$ SMC $\rightarrow$ EA	-0.120	5.878	<0.001	Supported

Discussion

This study examined how sensory marketing cues influence brand loyalty through emotional attachment and whether age and gender shape this relationship within the context of shopping malls. Grounded in the Stimulus–Organism–Response framework, the findings demonstrate that sensory marketing cues not only strengthen consumers' emotional attachment but also directly and indirectly enhance brand loyalty. These results reinforce the argument that consumers respond to integrated multisensory experiences rather than isolated marketing stimuli, extending the application of the S-O-R framework to the complex, multi-brand environment of shopping malls.

The positive effect of sensory marketing cues on emotional attachment and brand loyalty is consistent with the theoretical propositions of Krishna (2012) and Hultén (2011), who argue that multisensory experiences create stronger emotional and cognitive responses than single-sensory stimuli. The findings also support recent empirical evidence showing that integrated sensory experiences strengthen emotional engagement, customer retention, and brand loyalty across diverse retail settings. Likewise, the results are consistent with Zha et al. (2024), who reported that visual, auditory, olfactory, tactile, and gustatory cues jointly enhance brand loyalty through psychological mechanisms such as satisfaction, brand love, and attachment. The present study extends this evidence by demonstrating that these relationships remain robust even in shopping malls, where consumers are simultaneously exposed to multiple brands and competing sensory stimuli.

The findings further confirm that emotional attachment serves as a key psychological mechanism linking sensory marketing to brand loyalty. The significant partial mediation observed in this study supports the S-O-R proposition that environmental stimuli influence behavioural responses through consumers' internal affective states. This finding is consistent with Park et al. (2010), Thomson et al. (2005), and Shahid et al. (2022), who identified emotional attachment as an important antecedent of brand loyalty. It also aligns with Chen and Lin (2017), who found that sensory experiences shape purchase behaviour by first generating positive emotional responses, and with Gao and Shen (2024), who demonstrated that sensory brand experiences foster loyalty both directly and indirectly through consumers' psychological evaluations. However, unlike many previous studies that examined luxury brands, coffee shops, tourism destinations, or single-brand retail settings, the present research demonstrates that emotional attachment remains an effective mechanism for translating multisensory experiences into loyalty even within the heterogeneous environment of shopping malls. This finding broadens the applicability of sensory marketing theory to more dynamic retail contexts.

The moderating analysis provides additional insights into consumer heterogeneity. The results reveal that age significantly moderates the relationship between sensory marketing cues and emotional attachment, whereas gender does not. The negative moderating effect of age suggests that younger consumers are more emotionally responsive to immersive sensory experiences, while older consumers appear less influenced by such stimuli. This finding supports Huaman-Ramirez and Merunka (2019), who reported age-related differences in consumers' responses to brand experiences, and is consistent with McKay-Nesbitt et al. (2011), who argued that emotional and cognitive processing of marketing communications varies across age groups. The findings imply that younger shoppers are more receptive to novel, experience-oriented retail environments, whereas older consumers may rely more on familiarity and functional evaluations.

In contrast, the absence of a significant moderating effect of gender differs from the findings of Gao and Shen (2024), who reported stronger sensory brand experiences among female consumers through brand–self connection. One possible explanation is the distinctive context of Kathmandu's shopping malls, where male and female shoppers encounter similar atmospheric conditions and shared sensory cues. Consequently, although gender may influence consumers' overall emotional attachment, it does not substantially alter how sensory marketing cues are translated into emotional responses. This finding suggests that demographic differences observed in single-brand or culturally specific settings may not necessarily generalize to multi-brand shopping environments, highlighting the importance of contextual factors in sensory marketing research. By

validating these relationships in a developing-country retail context, this study contributes to the growing sensory marketing literature and provides new evidence that multisensory retail environments can foster enduring consumer-brand relationships even in settings characterised by multiple competing brands and overlapping sensory stimuli.

Conclusion

This study examined the influence of sensory marketing cues on brand loyalty through emotional attachment in the context of shopping malls, while also investigating the moderating roles of age and gender. The findings demonstrate that sensory marketing cues significantly strengthen consumers' emotional attachment and directly enhance brand loyalty. Moreover, emotional attachment partially mediates the relationship between sensory marketing cues and brand loyalty, confirming that emotional responses constitute an important psychological mechanism through which multisensory experiences influence consumer behavior. Among the five sensory dimensions, olfactory and visual cues emerged as the strongest contributors to the overall sensory marketing experience, while age, but not gender, significantly moderated the relationship between sensory marketing cues and emotional attachment.

From a theoretical perspective, this study extends the application of the S–O–R framework by validating its explanatory power in a multi-brand shopping mall environment, where consumers are simultaneously exposed to multiple sensory stimuli. Unlike much of the existing literature that focuses on single-brand retail settings, this study demonstrates that integrated sensory experiences continue to generate emotional attachment and brand loyalty even within complex retail environments. Furthermore, the findings enrich sensory marketing literature by highlighting age as an important boundary condition in consumers' emotional responses to sensory experiences.

The study also offers several practical implications for shopping mall managers and retailers. Rather than relying solely on promotional activities or price-based competition, managers should design integrated multisensory environments that strategically combine visual, auditory, olfactory, tactile, and gustatory cues to create memorable shopping experiences. Particular attention should be given to visual merchandising and ambient scent, as these dimensions contribute most strongly to consumers' overall sensory experience. The significant moderating effect of age further suggests that sensory strategies should be tailored to different customer segments, with more immersive and novel experiences targeted toward younger consumers while maintaining familiar and comfortable environments for older shoppers. Such customer-centered sensory strategies can strengthen emotional attachment, encourage repeat patronage, and foster long-term brand loyalty.

Despite these contributions, this study has several limitations. First, the findings are based on cross-sectional data collected from shopping malls in Kathmandu Valley, which may limit the generalizability of the results to other retail formats and cultural contexts. Second, the study focused exclusively on age and gender as moderating variables; future research may examine additional consumer characteristics, such as personality traits, shopping motivations, or digital engagement, as well as compare physical and omnichannel retail environments to provide a more comprehensive understanding of sensory marketing and consumer behavior.

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