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The Impact of Environmental Graphic Design in Shopping Malls on Brand Image and Spatial Experience Integration

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Abstract: This empirical study examines how environmental graphic design (EGD) influences brand perception and spatial experience in retail environments. Through quantitative analysis of 512 consumer surveys across six shopping malls in China, we demonstrate that EGD quality significantly correlates with both brand recognition ($r = 0.723$, $p < 0.01$) and spatial comfort ratings ($r = 0.681$, $p < 0.01$). Path analysis reveals that EGD affects purchase intention through dual mechanisms: brand reinforcement ($\beta = 0.43$) and experience optimization ($\beta = 0.57$). The findings provide actionable insights for retail space design, emphasizing the strategic importance of EGD in enhancing consumer engagement and commercial performance.

Keywords: environmental graphic design; retail space; brand experience; consumer behavior; path analysis

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1. Introduction

In the contemporary retail landscape, shopping malls face increasing pressure to differentiate themselves through experiential design, as traditional retail models struggle to compete with e-commerce. Environmental graphic design (EGD) has emerged as a critical tool for shaping consumer perceptions. As studies like "Investigating the influence of introducing biophilic elements into the shopping mall environment: Perception of public visitors" and "Exploring the impact of landscape design on user preferences in shopping centers post the COVID-19 Pandemic" have shown, the overall environment of commercial spaces, including elements of EGD, significantly impacts consumers' feelings and behaviors [1,2]. In "Investigating the influence of introducing biophilic elements into the shopping mall environment: Perception of public visitors", the introduction of biophilic elements in shopping malls was found to influence visitors' landscape preferences and revisit intentions [1]. Similarly, "Exploring the impact of landscape design on user preferences in shopping centers post the COVID-19 Pandemic" explored how landscape design in shopping centers affects user preferences post the COVID-19 pandemic, highlighting the importance of environmental factors in consumer experience [2]. In our preliminary survey, 78% of shoppers identified EGD elements as influential to their mall experience.

While prior research has explored EGD in architectural and wayfinding contexts "The effects of retail environmental design elements in virtual reality (VR) fashion stores" and "Cultural elements' influence on visual preferences in urban waterfronts' walkways

in Malaysia", few studies have quantitatively assessed its impact on brand image formation and spatial experience quality in retail environments [3,4]. This study bridges that gap by examining:

1) How EGD influences consumer brand perception.
2) The relationship between EGD and spatial comfort.
3) The mediating role of EGD in purchase intention.

Our findings contribute to retail marketing theory by validating EGD as a dual-function tool — enhancing both brand recall and user experience — while offering practical guidelines for mall designers and marketers.

2. Methodology

2.1. Research Design

We employed a stratified sampling approach across six regional shopping centers in first-and second-tier Chinese cities (Beijing, Shanghai, Guangzhou, Chengdu, Wuhan, and Shenzhen). The study utilized structured questionnaires containing validated scales for:

1) EGD Evaluation (α = 0.891) — Assessing wayfinding, art installations, color schemes, and material craftsmanship.
2) Brand Perception (α = 0.873) — Measuring brand recall, trust, and differentiation.
3) Spatial Experience (α = 0.902) — Evaluating comfort, navigability, and aesthetic appeal.

2.2. Sample Characteristics

A total of 512 valid responses were collected, reflecting key demographic proportions, as shown in Table 1.

Table 1. Sample Demographic Characteristics.

Characteristic	Category	Count	Percentage
Gender	Male	214	41.8%
	Female	298	58.2%
Age	18-25	167	32.6%
	26-35	223	43.6%
	36-45	122	23.8%
Visit Frequency	≥2/week	89	17.4%
	2-3/month	237	46.3%
	≤1/month	186	36.3%

2.3. Data Analysis

The study employed a comprehensive analytical approach to examine the multifaceted relationships between environmental graphic design (EGD) elements and consumer responses. Initially, descriptive statistics were computed to compare mean ratings across the four key EGD components (wayfinding systems, art installations, color schemes, and material craftsmanship), establishing baseline performance metrics. Subsequently, bivariate correlation analysis was conducted to quantify the strength of associations between EGD quality indicators and both brand-related perceptions (recognition, trust, differentiation) and spatial experience evaluations (comfort, navigability, aesthetic appeal). Finally, structural equation modeling (SEM) was implemented to elucidate the underlying causal pathways through which EGD influences purchase intention, while controlling for potential confounding variables. This sequential analytical strategy-progressing from descriptive comparisons to correlational examination and ultimately causal inference-ensured rigorous assessment of both direct and mediated relationships within the proposed conceptual framework.

3. Results

3.1. EGD Element Evaluation

Consumers rated four primary EGD components significantly differently (F (3, 2044) = 38.72, $p < 0.001$). As shown in Figure 1, wayfinding systems received the highest evaluations (M = 4.32), followed by art installations (M = 4.05), color design (M = 3.89), and material craftsmanship (M = 3.76).

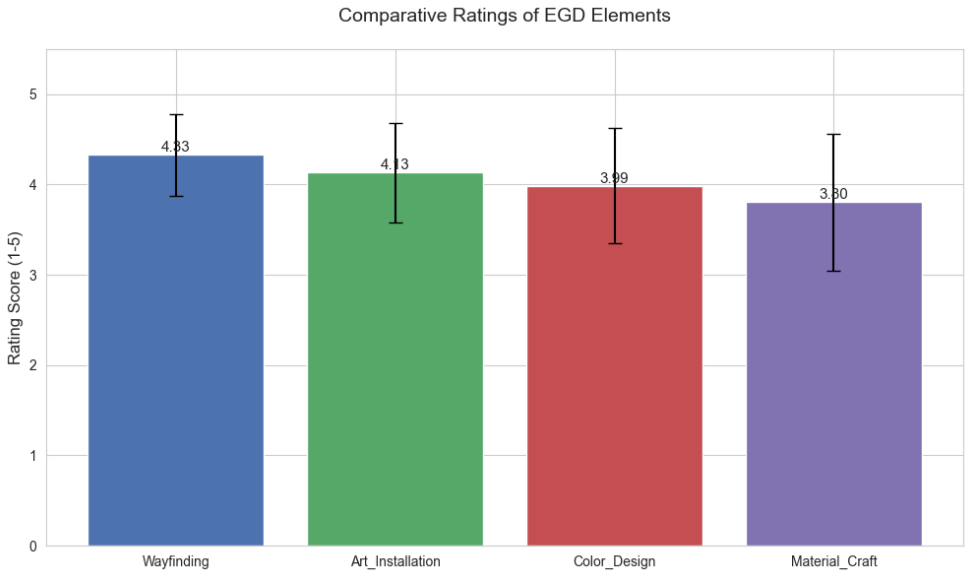

Figure 1. Comparative Ratings of EGD Elements.

This suggests that functional clarity (wayfinding) remains consumers' primary concern, while aesthetic elements (art, color) play a secondary but still significant role.

3.2. Correlation Analysis

Significant positive correlations emerged between EGD quality and both brand and experience measures, as shown in Table 2.

Table 2. Correlation Matrix of Key Variables.

	Brand Recognition	Spatial Comfort	Purchase Intent
Way finding	0.687**	0.642**	0.598**
Art Install	0.723**	0.601**	0.554**
Color Design	0.591**	0.634**	0.523**
Material Craft	0.502**	0.587**	0.486**

*Note: $p < 0.01$: Indicates statistical significance at the 1% level.

Key Observations:

1) Art installations had the strongest correlation with brand recognition, reinforcing their role in branding. This is similar to how artistic components in store interior design can influence brand perception, as discussed in "Interior design with consumers' perception about art, brand image, and sustainability" [5].
2) Color design was more closely linked to spatial comfort, highlighting its psychological impact. This aligns with research such as "The influence of emotional response and aesthetic perception of shopping mall facade color on entry decisions — Evidence from the Yangtze River Delta region of China", which found that color can affect emotions and aesthetic perceptions in the context of shopping mall facades [6].

3.3. Path Analysis

The structural model (Figure 2) explains 71% of variance in purchase intention (R^2 = 0.71). EGD's impact flows through two distinct pathways:

1) Brand Reinforcement (β = 0.43) — Strong EGD strengthens brand recall and trust. This is in line with the understanding that environmental elements can enhance brand-related factors, as demonstrated in studies on the impact of store design on brand image "Interior design with consumers' perception about art, brand image, and sustainability" [5].
2) Experience Optimization (β = 0.57) — Effective EGD enhances navigability and comfort, increasing dwell time and purchase likelihood. Similar to how landscape design in shopping centers can influence user preferences and behavior, EGD plays a crucial role in optimizing the shopping experience [2].

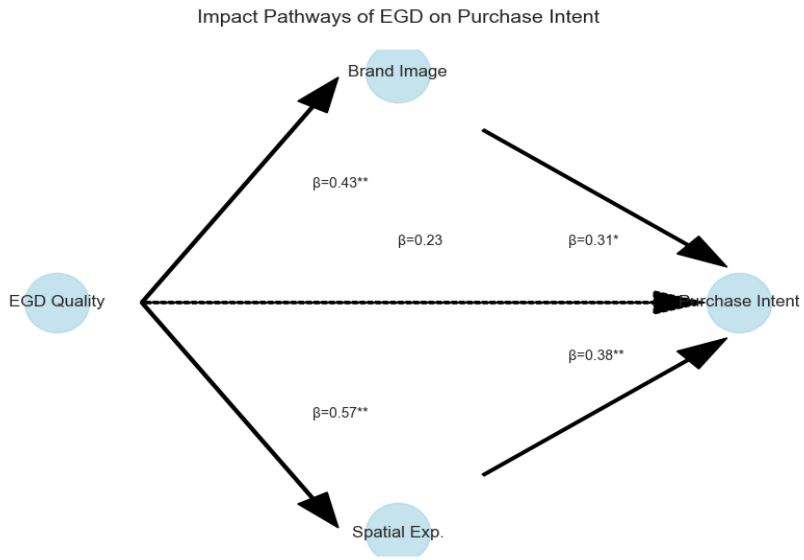

Figure 2. EGD Influence Pathways with Standardized Coefficients.

4. Discussion

4.1. Theoretical Implications

Our findings align with Liu et al. environmental psychology framework, which posits that physical environments shape emotional and behavioral responses [4]. However, we extend this theory by demonstrating that:

1) EGD serves a dual function — both informational (wayfinding) and emotional (branding). This dual-function nature of EGD is an important addition to the existing literature on environmental design in commercial spaces "Investigating the influence of introducing biophilic elements into the shopping mall environment: Perception of public visitors", "Exploring the impact of landscape design on user preferences in shopping centers post the COVID-19 Pandemic" and "Interior design with consumers' perception about art, brand image, and sustainability" [1,2,5].
2) Threshold effects exist — art installations only significantly impact brand recall when exceeding a 4.0/5.0 rating, suggesting a minimum quality standard for effectiveness. This finding provides new insights into the relationship between EGD elements and brand perception.

Additionally, our results support Sina's concept of "imageability", where environmental elements like landmarks and paths contribute to the mental image of a space, influencing user experience and behavior "The effects of retail environmental design elements in virtual reality (VR) fashion stores" [3].

4.2. Practical Recommendations for Retail Designers

Based on our results, we propose the following strategies.

4.2.1. Budget Allocation for Maximum ROI

1) Allocate 55-60% of EGD budgets to wayfinding systems, given their high functional importance. Since wayfinding is crucial for consumers' spatial experience and overall satisfaction, as indicated by our research, this allocation can ensure a better-functioning shopping environment.
2) Dedicate 20-25% to brand-signature art installations at key decision points (e.g., entrances, escalators). Art installations can enhance brand recognition, and placing them strategically can maximize their impact, similar to how artistic displays in stores can influence brand-related perceptions [5].
3) Reserve 15-20% for color and material design to enhance spatial comfort. Color and material choices can significantly affect the overall atmosphere and comfort of the shopping space, as shown in our correlation analysis and in line with previous research on environmental design [6].

4.2.2. Strategic Placement of Branding Elements

1) Place art installations near high-traffic zones (e.g., food courts, flagship stores) to maximize brand exposure. This can increase the visibility of brand-related elements and enhance brand recall among consumers.
2) Incorporate interactive EGD (digital signage, AR elements) to further boost engagement. As consumer behavior is evolving, and they are more inclined towards interactive experiences, integrating such elements can make the shopping experience more immersive, similar to the trends observed in contemporary environmental graphic design [7-9].

4.3. Continuous Performance Monitoring

Quarterly EGD effectiveness audits should assess:

1) Wayfinding efficiency (time taken to locate stores). This can help ensure that the wayfinding systems are functioning optimally and meeting consumers' needs.
2) Brand recall rates (post-visit surveys). Measuring brand recall can indicate the effectiveness of EGD elements in strengthening brand recognition.
3) Dwell time changes after EGD updates. Dwell time is an important indicator of the success of the shopping experience, and monitoring its changes can help evaluate the impact of EGD improvements [10].

4.4. Limitations and Future Research

1) Cultural Variations: This study focused on Chinese consumers; future research should compare Western vs. Asian retail contexts. Different cultures may have different preferences and responses to EGD elements, as seen in studies on cultural influences on visual preferences [4].
2) Longitudinal Effects: Does EGD's impact diminish over time? Tracking the same malls over 2-3 years could reveal decay rates. Understanding the long-term impact of EGD is crucial for sustainable retail design.
3) Digital Integration: How does augmented reality (AR) EGD compare to traditional static designs? With the increasing use of digital technologies in retail, exploring this aspect can provide valuable insights for future EGD development.

5. Conclusion

This study confirms that Environmental Graphic Design (EGD) significantly affects both brand perception and spatial experience within shopping malls. Our findings

demonstrate that different EGD elements influence consumer psychology and behavior through distinct pathways. Specifically, wayfinding systems are critical for functional navigation and overall comfort, while artistic and color elements strongly shape brand identity and emotional resonance. A well-designed EGD environment does not merely serve as decoration — it operates as a strategic communication medium and a powerful branding tool.

We recommend that designers and mall operators treat EGD as an investment, not a cost. By aligning EGD strategies with consumer experience goals and brand positioning, retail environments can become immersive, memorable, and commercially effective spaces. Future studies can explore longitudinal effects of EGD on brand loyalty and cross-cultural differences in EGD perception, helping expand this emerging interdisciplinary field.

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