

What Matters Most in Apparel Store Atmospherics? A Conjoint Analysis of Consumer Preferences

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Abstract

This study examined how much seven atmospheric and visual-merchandising cues contributed to consumers' stated preference for apparel stores in Kolkata, India. A rating-based full-profile conjoint experiment was conducted between January and April 2026 with 256 adult apparel shoppers who completed the questionnaire in person. Respondents rated 12 estimation profiles and three holdout profiles drawn from a balanced, near-orthogonal fractional factorial design (3×2^6) of product-display organisation, layout/aisle space, lighting, colour scheme, background music, window display and signage. Part-worth utilities were estimated by effects-coded ordinary least squares with respondent-clustered standard errors. Layout/aisle space had the greatest relative importance (29.81%), followed by window display (20.70%), product-display organisation (19.00%), signage (12.07%), lighting (10.78%), background music (5.33%) and colour scheme (2.31%). The model explained 47.8% of rating variance and predicted holdout means with a root mean square error of 0.129. The findings suggest that retailers should prioritise spatial openness and visual merchandising, weighing each change against its cost. The study compared spatial, ambient, visual-merchandising and informational cues within a single experiment in an Indian metropolitan apparel market.

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1. Introduction

Despite the growth of digital commerce, the physical store remains an important interface through which consumers encounter products and brands. This is especially so in apparel retailing, where shoppers inspect fabrics and colours, compare alternatives and experience merchandise within a spatial and sensory environment. Competition among physical apparel retailers therefore extends beyond assortment and price to the design of the shopping environment.

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Kotler [1] described atmospherics as the deliberate design of buying environments to produce particular effects on buyers. Evidence that physical surroundings shape how service encounters are evaluated [2] led to Bitner's [3] servicescape framework, which groups environmental cues into ambient conditions, spatial layout and functionality, and signs, symbols and artefacts. The Stimulus–Organism–Response (S–O–R) paradigm explains how such stimuli shape internal states and approach or avoidance responses [4], [5]. Store environment cues have been linked to quality inferences and store image [6], to value creation through atmospheric affect [7] and to patronage intentions [8]. Recent reviews map this large literature [9], show that visual merchandising and store atmospherics increasingly overlap [10], and report positive but unequal associations of product display, colour, layout and lighting with shopping outcomes [11].

Shoppers, however, do not experience cues one at a time. Lighting, layout, signage, music and merchandise presentation coexist in a single store and are evaluated together. Experimental work has shown that combinations of ambient, design and social cues shape merchandise value and patronage intentions [12]–[14], but such designs typically manipulate a small number of cues. In our reading, less is known about how much each of many simultaneously encountered cues contributes to the evaluation of a complete store, particularly for spatial, visual-merchandising and informational cues. Conjoint analysis suits this question because it derives attribute importance and level utilities from evaluations of experimentally varied, complete alternatives [15], [16].

This study applies a rating-based full-profile conjoint design to seven store attributes: product-display organisation, layout/aisle space, lighting, colour scheme, background music, window display and category/directional signage. It estimates their relative contribution to stated store-choice likelihood among apparel shoppers in Kolkata, a large metropolitan apparel market in eastern India. Because environmental preferences can depend on cultural and retail context [17], context-specific estimates are useful to both researchers and retailers. The study contributes by (a) comparing seven cues within one experiment, (b) integrating spatial, ambient, visual-merchandising and informational attributes in a common framework, as recent reviews recommend, and (c) providing part-worth utilities and importance estimates for an Indian metropolitan market, with a holdout check on predictive validity.

2. Theoretical Background and Research Gap

2.1. Store cues in the servicescape

The study uses servicescape theory to organise the cues and treats S–O–R as background. It does not model an organism construct or observe purchases; it examines the stimulus–preference link by estimating how alternative cue configurations affect stated store-choice likelihood.

Seven cues were selected. Product display performs aesthetic and informational functions, and Oduro and De Nisco [11] found it had the strongest association with shopping outcomes among four design cues ($r = .28$), ahead of colour (.24), layout (.23) and lighting (.22). Three display logics were compared: price-organised, lifestyle/theme-organised and colour-coordinated. Layout and aisle space affect navigation, accessibility and perceived spaciousness [3], and crowded conditions have long been linked to changes in buyer behaviour [18]. Lighting has functional and

atmospheric roles; Indian simulation evidence shows that colour temperature and illuminance jointly shape preferences in apparel stores [17]. Colour and music are among the most studied cues, and meta-analysis shows small-to-medium effects that vary by context [19]; music effects have also been meta-analysed in tourism and hospitality settings [20]. Window displays communicate merchandise and positioning before entry and form part of a store's outdoor atmospherics [21], and store-window design can influence shopper behaviour [22]. Signage supports search and wayfinding and belongs to the signs, symbols and artefacts dimension of the servicescape [3].

2.2. Research gap and research questions

Meta-analyses compare average effects across separate studies that differ in manipulations, samples and outcomes [11], [19], so they cannot show how much each cue contributes when shoppers evaluate all of them within one store. Multi-cue experiments typically vary few cues, and, to our knowledge, within-study comparisons that place spatial, visual-merchandising and informational cues alongside ambient cues are less common. Context also matters [17]. The additive conjoint model used here assumes that cues can compensate for one another, and the design contains no price or cost attribute. The estimates therefore describe relative contribution to stated preference within the levels studied, not willingness to pay or to sacrifice one cue for another. The study asks:

RQ1. What is the relative importance of the seven attributes in consumers' stated preference for an apparel store?

RQ2. What part-worth utility does each attribute level contribute to store-choice likelihood?

RQ3. Which combination of levels yields the highest predicted store-choice utility within the design space?

RQ4. How well do the estimated utilities predict evaluations of profiles not used in estimation?

No directional hypotheses are proposed because, for several attributes (notably colour scheme and product-display organisation), prior research does not establish a consistent direction; the aim is to estimate relative utility.

3. Research Method

3.1. Attributes and design

Attributes were chosen for theoretical and managerial relevance, realism, distinctiveness and ease of comprehension. Attributes and levels were reviewed by experts in marketing and retailing and checked with consumers similar to the target group, and a pilot preceded the main fieldwork. "Minimal" levels for window display and signage were worded so as not to appear deficient. Table 1 shows the attributes and levels.

Table 1. Conjoint attributes and levels

Attribute	Levels
Product-display organisation	Price-organised; Lifestyle/theme-organised; Colour-coordinated
Store layout/aisle space	Spacious with wide aisles; Compact with narrower aisles
Lighting	Bright, cool-white; Soft, warm
Store colour scheme	Warm-toned; Cool-toned
Background music	Soft background music; No background music
Window display	Prominent styled window display; Minimal/no styled window display
Category/directional signage	Clear/prominent signage; Minimal signage

The attributes form a 3×2^6 structure with 192 possible store configurations. A fractional factorial main-effects design of 12 estimation profiles was used. It is balanced (each product-display level appears four times, each binary level six times) and near-orthogonal (condition number ≈ 2.41), and identifies the eight attribute parameters plus an intercept. Three additional holdout profiles were interspersed among the estimation profiles and not identified to respondents, so each respondent rated 15 hypothetical apparel stores. Holdouts were used only for predictive validation.

3.2. Task, respondents and fieldwork

For each profile respondents answered: “Considering the overall store configuration described above, how likely would you be to choose this store for apparel shopping?” on a seven-point scale (1 = extremely unlikely, 7 = extremely likely). They were asked to consider all seven features together and were briefly familiarised with the attributes and levels beforehand.

Eligible respondents were adults (18 years or older) resident in Kolkata who had bought apparel from an organised physical retail store in the preceding six months. Data were collected between January and April 2026. Respondents were reached through store visits, college networks and online sharing, and completed the questionnaire in person. Participation was voluntary and anonymous, and respondents were informed of the purpose of the study. The target was 250 usable respondents, and 256 were obtained. All 256 provided complete ratings for all 15 profiles.

3.3. Estimation and validation

Ratings were analysed in long format with effects coding: binary attributes were coded +1/−1, and product display used two columns (price-organised = (1, 0); lifestyle/theme = (0, 1); colour-coordinated = (−1, −1)). The main-effects model was estimated by pooled OLS on the 12 estimation profiles:

$$Y_{ij} = \beta_0 + \beta_1 PDI_{ij} + \beta_2 PD2_{ij} + \beta_3 SL_{ij} + \beta_4 LT_{ij} + \beta_5 CS_{ij} + \beta_6 MU_{ij} + \beta_7 WD_{ij} + \beta_8 SG_{ij} + \varepsilon_{ij}(1)$$

where Y_{ij} is respondent i 's rating of profile j , and PD, SL, LT, CS, MU, WD and SG denote product display, layout, lighting, colour scheme, music, window display and signage. Because each respondent supplied 12 ratings, standard errors were clustered at the respondent level [23], and a cluster-robust Wald test assessed joint significance. Part-worth utilities sum to zero within each attribute, and relative importance was computed from utility ranges:

$$Importance_k = [Range_k / \sum Range_k] \times 100 \quad (2)$$

Importance describes contribution within the levels tested, not the intrinsic importance of a cue. Predictive validity was assessed by comparing predicted and observed means for the three holdouts. As a sensitivity check on treating the seven-point rating as metric, an ordered-logit model with clustered standard errors was also estimated.

4. Results and Discussion

4.1. Data screening and model fit

The 256 respondents supplied 3,072 estimation ratings and 768 holdout ratings. All values were within the 1–7 range, and no respondent gave the same rating to all profiles. The model explained 47.8% of rating variance ($R^2 = .478$; adjusted $R^2 = .476$), and the eight effects were jointly significant, $F(8, 255) = 556.01, p < .001$.

4.2. Part-worth utilities

Table 2. Effects-coded conjoint model with respondent-clustered inference

Parameter	β	Clustered SE	t	p	95% CI
Intercept	4.250	0.042	100.05	<.001	[4.167, 4.334]
Product display: Price-organised	0.464	0.024	19.13	<.001	[0.416, 0.512]
Product display: Lifestyle/theme	−0.043	0.027	−1.61	.109	[−0.095, 0.010]
Layout: Spacious	0.694	0.016	44.73	<.001	[0.664, 0.725]
Lighting: Bright/cool-white	0.251	0.018	14.07	<.001	[0.216, 0.286]
Colour scheme: Warm-toned	0.054	0.014	3.78	<.001	[0.026, 0.082]
Music: Soft background	0.124	0.016	7.73	<.001	[0.092, 0.156]
Window display: Prominent styled	0.482	0.016	29.53	<.001	[0.450, 0.514]
Signage: Clear/prominent	0.281	0.023	12.47	<.001	[0.237, 0.325]

Note. $N = 256$ respondents; 3,072 estimation observations. Standard errors clustered by respondent. The utility of each omitted level is the negative of the coefficient shown (for colour-coordinated display, −0.421).

Price-organised display had a positive utility (0.464), lifestyle/theme display was close to the attribute mean (-0.043 , $t(255) = -1.61$, $p = .109$), and colour-coordinated display had a negative utility (-0.421). Product display was nonetheless significant as an attribute, $F(2, 255) = 227.05$, $p < .001$. Spacious aisles, bright/cool-white lighting, a warm-toned scheme, soft music, a prominent styled window and clear signage all had positive utilities; the warm-versus-cool colour effect was statistically detectable but small.

4.3. Relative importance (RQ1)

Table 3. Relative attribute importance and attribute-level tests

Attribute	Utility range	Relative importance	<i>F</i>	df	<i>p</i>
Layout	1.389	29.81%	2001.13	1, 255	<.001
Window display	0.964	20.70%	871.93	1, 255	<.001
Product display	0.885	19.00%	227.05	2, 255	<.001
Signage	0.562	12.07%	155.44	1, 255	<.001
Lighting	0.502	10.78%	198.03	1, 255	<.001
Background music	0.248	5.33%	59.69	1, 255	<.001
Colour scheme	0.107	2.31%	14.32	1, 255	<.001

Note. Relative importance = utility range ÷ sum of ranges × 100. Tests are cluster-robust Wald tests.

Layout was the most influential attribute (29.81%), followed by window display (20.70%) and product display (19.00%); signage accounted for 12.07%, lighting 10.78%, music 5.33% and colour scheme 2.31%.

4.4. Highest-predicted configuration (RQ2 and RQ3)

Combining the preferred levels (price-organised display, spacious aisles, bright/cool-white lighting, warm-toned scheme, soft music, prominent styled window, clear signage) gives the highest predicted rating in the design space, approximately 6.60 on the seven-point scale. This is an additive prediction from the estimated model, not an observed rating, and it describes aggregate stated preference within the tested levels rather than a universally optimal store.

4.5. Holdout validation (RQ4)

Table 4. Holdout validation

Holdout	Observed mean	Predicted mean	Observed – predicted
H1	4.965	5.181	−0.216
H2	3.789	3.741	0.048
H3	4.367	4.396	−0.029

Note. Means across 256 respondents per profile. Aggregate RMSE = 0.129; MAE = 0.098.

The aggregate RMSE across the three holdout means was 0.129 (MAE = 0.098); at the individual-rating level (768 observations) RMSE was 1.134 and MAE was 0.942. Predicting each holdout with the estimation-sample grand mean (4.250) would give an aggregate RMSE of 0.496 and MAE of 0.431, so the model reduced aggregate prediction error by roughly three-quarters. With only three holdouts, this is supportive internal evidence rather than strong external validation.

4.6. Sensitivity check

The ordered-logit model preserved the direction and statistical support of the principal effects. The lifestyle/theme display contrast remained weak ($p = .425$), and the small warm-toned colour effect remained significant ($p = .003$).

4.7. Discussion

The results show a clear hierarchy. Layout/aisle space contributed most to stated store choice, followed by window display and product-display organisation, then signage and lighting, with music and colour contributing little within the contrasts tested. Cues that ease movement, structure merchandise and communicate the store proposition mattered more than ambient sensory qualities.

The prominence of layout (utility range 1.389) is consistent with the servicescape proposition that spatial layout and functionality shape how easily customers use an environment [3]. Meta-analyses find layout positively associated with shopping outcomes [11]; the present experiment adds a comparison showing how large its utility is relative to other cues varied at the same time. Window display and product-display organisation together accounted for about 40% of importance, which supports the integrated treatment of visual merchandising and atmospherics [10] and is consistent with evidence that window design can influence shopper behaviour [22]. Within product display, price-organised presentation had the highest utility and colour-coordinated the lowest; this suggests that respondents valued display logic that supports comparison, though the design cannot show whether they were responding to price legibility or to the store format that price organisation signals.

Bright/cool-white lighting (10.78%) is consistent with the functional role of illumination and with Indian evidence on lighting preferences in apparel stores [17]. Soft music (5.33%) and warm colour (2.31%) contributed little. This is not inconsistent with meta-analytic evidence that music and colour matter [19]: those effects are small to medium on average, and soft-versus-no music and warm-versus-cool palettes are subtle contrasts that compete here with cues whose levels differ more visibly. The small utilities indicate limited relative contribution within this design, not an absence of effect. Survey evidence from shopping malls similarly links shoppers' attitudes towards colour schemes and music with satisfaction and word-of-mouth through the desire to stay [24]; the present design adds how small these cues are relative to spatial and merchandising cues. Signage (12.07%) reinforces the informational role of the servicescape and complements the layout result.

Because data come from one city, the design cannot separate Kolkata-specific preferences from general ones. The high utility of spacious aisles may reflect the contrast with crowded traditional

markets, and the preference for price-organised display may reflect value-seeking; both are plausible but untested here.

4.8. Implications

Theoretically, the study shows that store preference cannot be explained by ambient conditions alone: spatial, visual-merchandising and informational cues carried most of the stated preference in this experiment. It provides comparable, within-experiment estimates of the relative contribution of seven cues and evidence from an Indian metropolitan market. It does not test the S–O–R chain; it identifies which cues carry the most stated preference and are therefore most worth including in such models.

For retailers, the findings suggest a prioritisation logic rather than a checklist: where physical constraints allow, clear circulation and spatial openness offer the largest utility gain, followed by prominent styled windows and display organisation that supports comparison; signage and lighting form a second layer, and music and colour scheme a smaller one. Because the design has no cost attribute, priorities should be weighed against implementation cost; reconfiguring aisle space usually needs more capital and floor area than changing signage, lighting or music, so a large utility does not by itself imply the highest return. The 6.60 configuration should not be treated as a universal blueprint, as premium boutiques, value-fashion chains and experiential stores may show different preferences.

4.9. Limitations and future research

Four limitations qualify the findings. First, ratings are stated preferences for hypothetical, cost-free store configurations, not observed visits or purchases; field experiments, virtual stores or observed choice data could test them. Second, the main-effects model assumes compensation among cues and cannot detect interactions (for example, between lighting and colour scheme), and utilities are aggregate, so heterogeneity across shopper segments is not examined; hierarchical Bayes or latent-class estimation could address this. Third, attribute levels simplify complex constructs (bright/cool-white lighting combines brightness and colour temperature, and music is soft versus none), and only three holdouts were used for validation. Fourth, respondents were recruited through store visits, college networks and online sharing in one city rather than by probability sampling, so results may not represent all Kolkata shoppers or other markets; multi-city replication is recommended.

5. Conclusion

Treating store atmospherics as a bundle of simultaneously experienced cues shows which cues carry stated preference. Among apparel shoppers in Kolkata, layout/aisle space was the dominant driver, followed by window display and product-display organisation; signage and lighting contributed moderately, and music and colour scheme little. The model explained 47.8% of rating variance and predicted holdout means closely, indicating that a compact rating-based conjoint design can give retailers usable evidence on where store-design effort matters most.

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