

Shelf Space Schemas: Myth or Reality?

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Abstract

A series of studies identify that consumers hold beliefs about how retailers organize product displays in stores. These beliefs do not reflect reality, but consumers pervasively use them even when discredited. Study 1 finds that consumers believe popular products are placed on middle shelves, expensive products on top shelves and promoted products on the extremes of a display. However, a field study encompassing two different geographical areas, eight stores and four product categories shows that retailer layouts contradict consumers' beliefs about middle and horizontal positions, but they follow consumers' intuitions about verticality, albeit, inconsistently. Based on these findings about the mismatch between consumers' beliefs and retailers' actual assortments, a laboratory experiment examines whether position effects are robust. The study finds that position effects are only partially attenuated when consumers are explicitly informed that store layouts are not informative. A discussion of implications for retailers and product managers follows.

Keywords: shelf placement, cognitive schemas, retail strategy, congruency theory.

Shelf Space Schemas: Myth or Reality?

Proliferation of brands, new product introductions and the scarcity of prime shelf space all lead to intense and costly battles for shelf space between manufacturers and retailers (Forster, 2002). Such aggressive negotiation for prime shelf space suggests that consumers make choice decisions at the point of sale with product placement influencing the attractiveness of offerings (Rettie and Brewer, 2000). In fact, Proctor & Gamble calls the three to seven seconds that someone notices an item on a store shelf the “first moment of truth” and believes they are a crucial determinant of product choice (Nelson and Ellison, 2005).

However, despite the importance of shelf placement in retailers’ and consumers’ decisions, consumer psychologists have paid little systematic attention to the issue of product placement in retail shelf space (but see Chandon, Hutchinson, Bradlow and Young, 2009; Drèze, Hoch, and Purk, 1994; Valenzuela and Raghurir, 2009). Consequently, there is little consensus about what constitutes prime retail shelf space positions for both retailers and consumers. For example, in a recent issue of a popular news magazine, two articles on the same page make different claims regarding how popular brands and store brands are placed on supermarket shelves. One claims that “because Americans read from left to right, shelf stockers tend to put name brands, like Heinz, on the left side of the ketchup display, and the lesser known, more profitable in-house brand on the right” (Lemonick, 2007, p.52). The other argues that “to capitalize on customer loyalty to certain brands, supermarkets make sure that popular labels, such as Heinz ketchup and Cheerios, are easy to spot and positioned near profitable store brands,” (Caplan, 2007, p.52). There are important implications for understanding the way consumers perceive and interpret the information conveyed by shelf space layouts. This is because shelf space placement influences

consumers' judgments and the decisions they ultimately make coupled with the fact that retailers are still unable to provide optimal shelf space layouts for their products.

This paper examines the extent to which the actual marketplace reflects consumers' expectations of what an optimal shelf space layout should be. This paper's findings demonstrate that consumers hold specific beliefs about prime shelf space arrangements for products. After identifying what these beliefs are, two studies assess how well retailers' assortment structures in the marketplace correspond to consumers' preferences. A series of lab and field studies indicate that consumers' preferences regarding ideal shelf space layouts are not well-matched in reality. The paper concludes with a discussion of the incongruity between consumers' ideal shelf space layouts and retail reality and the implications this incongruity has for both consumers and retailers alike.

1. Consumer beliefs about the marketplace

Consumer meanings of the physical ordering of people, items, and goods across contexts and domains are prominent (Taylor and Fiske, 1975). These meanings apply to spatial arrays ranging from the ordering of response alternatives (Attali and Bar-Hillel, 2003; Schuman and Presser, 1996), to the placement of people (McArthur and Post, 1977; Raghubir and Valenzuela, 2006) and choice items (Nisbett and Wilson, 1977; Valenzuela and Raghubir, 2009). In addition to general schemas about the physical ordering of people and objects in the world, Wright (2002) also suggests that consumers have schemas about the meaning of a product's physical position in the marketplace. For example, building on the findings of Bemmaor and Monchoux (1991) which show that point of purchase signage multiplied the effect of price reduction and augmented sales, Inman, McAlister and Hoyer (1990) find that consumers believe that products placed at the end of

the aisle are discounted, even when they are not, suggesting that consumers use aisle promotions as a proxy for price cuts. Valenzuela and Raghurir (2009) show that consumers expect retailers to place the most popular item in the middle of an array, leading to their choosing the central item when their goals are to purchase the most popular item.

In sum, prior literature shows examples of position-based schemas without offering a general framework of consumers' beliefs about which brand type goes in which position. The literature on optimal retail assortment has typically examined factors such as product and cross-space elasticities to maximize profitability (Corstjens and Doyle, 1981; Zufryden, 1986). However, shelf allocation decisions could also incorporate information about consumers' shared beliefs regarding the placement of brands with differing characteristics. Product characteristics, when accounted for, appear to be limited to turnover (Anderson, 1979), although the call to study them is over a quarter century old (Curhan, 1973). At least three different dimensions can differentiate brands within an industry: price (expensive versus cheap), sales volume or turnover (popular versus slow moving), and promotional strategy (Hi-Lo Promotion versus Every Day Low Price). Consumers could hold beliefs regarding where brands with each of these characteristics will be placed in a shelf display. Despite the empirical importance of these questions, prior research provides limited direction for *a priori* hypothesizing.

Specifically, this paper argues that the "Center = Popular" (cf. Valenzuela and Raghurir, 2009), and the "Aisle Display = Promotion" inferences (cf. Inman et al., 1990), are specific exemplars of a larger genre of shelf space beliefs that consumers hold (Wright, 2002). If consumers expect a popular product (e.g., a mainstream brand) to be found in the center of a display, where would consumers expect to find a brand that is slow-moving (e.g., a niche brand)? If a promoted brand is expected to be found on the horizontal extremes of a display, where would

consumers expect to find an EDLP brand such as a store brand that is typically promoted less often? Do consumers also have well developed shelf-space schemas for expensive versus cheap products? Based on prior literature in social cognition, this paper proposes that people also hold vertical schemas that higher is better, and that more expensive products would be placed higher in a display than cheaper ones (Meier and Robinson, 2004; Schubert, 2005). If popular products are expected to be found in the center, then consumers should expect to find slow moving products as far from the center as possible, that is, in one of the four extremes (top-right, top-left, bottom-right, and bottom-left). If consumers expect promoted products to be at the end of the aisle and popular products in the middle, then consumers will expect that retailers place store brands in a position that allows consumers to directly compare prices to the promoted and popular brands – that is, between them. The above arguments are summarized in the following propositions:

H1. Consumers' schemas about store layouts are a function of brand dimensions:

- a. Price Level:
 - i. Expensive brands are on the top
 - ii. Cheap brands are on the bottom
- b. Sales volume:
 - i. Popular brands are in the middle
 - ii. Slow moving brands are at the extremes
- c. Promotional Strategy:
 - i. Promoted brands are on the horizontal extremes
 - ii. Store brands are placed next to popular and promoted brands

Study 1 findings show that consumers hold schemas about the meaning of different positions in shelf space layouts. Study 2 examines whether these beliefs reflect retailers' actual

shelf space arrays and finds that there is a mismatch between consumers' beliefs and retailers' shelf space layouts based on the price, quality, and popularity of products, with the extent of the mismatch larger for certain positions. Finally, Study 3 examines whether position effects may be attenuated when consumers are explicitly informed that store layouts are not informative. Results show that inferences based in certain positions are pervasive and used even when discredited.

2. Study 1

The purpose of the first study is to assess whether spatial schemas exist for product placement, and to document their content. That is, this study documents people's lay beliefs regarding which type of products will be found in different shelf space positions.

2.1. Participants

Eighty three undergraduate business school students from two US campuses participated in this study for partial course credit.

2.2. Method

All participants were given an empty 5 x 5 (row x column) planogram with vowels (A, E, I, O and U from top to bottom rows respectively) denoting vertical position, and numbers (1, 2, 3, 4 and 5: from left to right columns) denoting horizontal position. For example, A1 is the top left cell, O3 the middle cell, and U5 the bottom-right cell. Participants were asked to make judgments regarding a premium brand, the price leader, popular brands, slow-moving brands, promoted brand, store brand, well-known brand, and a new brand. The first six descriptions test the whole set of hypotheses under H1, and the latter two were exploratory. The resulting design is a 5 (vertical: rows) x 5 (horizontal: columns) x 8 (brands) within-subjects design.

2.3. Dependent Measures

The study uses two tasks to elicit participants' shelf-space schemas:

Product Manager Role. In the first part of this exercise participants play the role of someone advising a product manager. The goal of this exercise is to examine the relative preference for different positions at an overall level and explore the extent to which preferences are contingent on brand type. Participants read: "Assume you are a consultant. You want to maximize sales of the brands that you manage. You can do this by advising clients of ideal (and worst) shelf space positions. For the brands you consult for, you need to choose the best position in a 5 x 5 array. That is, there are 5 rows (A, E, I, O, U) and 5 columns (1, 2, 3, 4 and 5) in the supermarket shelf area." Additionally, participants were told that they could choose the same position for multiple brands (i.e., they could sample the cells with replacement). Participants had to make:

- i. *Placement Choices:* Choice of ideal, second- best, and worst position from the 25 cells, separately for each of the eight brand descriptions.
- ii. *Preferences for Rows and Columns:* Preferences for each of the five rows and five columns elicited using a seven-point interval scale ("1 = Not at all preferred/ 7 = Preferred a whole lot"), separately for each brand description.

Retail Manager Role. In the role of retailer, participants are asked to allocate the eight brands to fill the 25 positions (with at least one cell per brand with multiple allocations possible), with the goal of maximizing category revenues. This requirement tests people's awareness of different position schemas.

Finally, participants indicated their level of motivation ($M = 3.3$) and interest ($M = 3.7$) in the exercise, task difficulty ($M = 4.0$) and how much time the task took ($M = 4.3$; all elicited on a

seven point scale, with higher numbers indicating a greater level) followed by stating their gender (Males = 37, Females = 36, non-response = 10).

2.4. Results

Results, by measure, are provided in Table 1a (product manager's placement choices), Table 1b (product manager's row preferences), Table 1c (product manager's column preferences) and Table 1d (retailers' shelf space assortment).

Tables 1a-d here.

2.4.1. Product manager perspective - Placement choices

Replicating Valenzuela and Raghurir's (2009) results, participants chose the center of the array (I3) as the ideal position in five brand categories (Popular = 32.53%, Store = 28.92%, Premium = 27.50%, New = 16.05%, and Slow-moving = 14.46%, $p < .05$ vs. random = 4%; Table 1a, column 1). Consistent with Inman et al.'s (1990) results, participants chose the extreme (left) position in the middle row as their ideal position for a promoted brand (I1: 10/ 82 = 12.20%, $p < .06$ vs. random 4%). Finally, participants chose the center of the bottom row as the ideal position for the cheapest brand (U3 = 13.75%., $p < .05$ vs. random 4%). Thus, from a product manager perspective, participants indicate a preference for the center for all brands except promoted ones.

2.4.2. Product manager perspective - Row and column preferences

An 8 (Brand) x 2 (Orientation: row vertical/ column horizontal) x 5 (Position: extreme / centrality based on positions A, E, I, O, U or 1, 2, 3, 4, 5) ANOVA on the preference ratings for rows and columns reveals main effects of horizontal/ vertical orientation ($F(1, 77) = 25.15, p <$

.001, $\eta^2 = .25$), and position ($F(4, 308) = 79.97, p < .001, \eta^2 = .51$), as well as their interaction ($F(4, 308) = 16.75, p < .001, \eta^2 = .18$). The interaction reflects that positions on the right are preferred to those on the left (5 is preferred to 1), whereas positions on the top are preferred to those on the bottom (A is preferred to U). The extent of position effect is contingent on type of product ($F(28, 2156) = 13.15, p < .001, \eta^2 = .08$) as is the position by orientation interaction ($F(28, 2156) = 4.96, p < .001, \eta^2 = .06$). Table 1b presents mean preferences for each row by type of brand. Table 1c indicates mean preferences for each column by brand. The last three columns of both tables show the overall F test, the linear contrasts and the quadratic contrast by brand.

The linear effect of verticality is supported at $p < .05$ for all brands except the cheapest brand ($p < .07$). The linear effect of horizontality is not significant except for the store brand. Center effects in both orientations are supported for all brands (quadratic contrasts, $p < .001$ for all). Means follow inverted U-shaped curves (higher preference for center versus extremes). The data suggests that consumers favor both higher vertical positions and central horizontal positions for most brands. From a product manager perspective, this evidence supports preference for the center.

However, given that the number of central positions is limited, and all brands cannot be placed in the center, which positions do consumers expect retailers to place an entire range of brands? The next analysis examines this question.

2.4.3. Retailer perspective - Shelf space assortment

The modal choices for the brand description in each position are tabulated in Table 1d. Results show that the premium brand is placed on the top (H1ai), the cheapest brand on the bottom (H1aai), the most popular brand in the center (H1bi), products on promotion at the

horizontal extremes (H1ci), and store brands next to promoted and popular brands in the center (H1cii). There does not appear to be a well-developed schema for slow moving brands. Thus, with the exception of slow moving brands at the extremes (H1bii), Hypothesis 1 is supported, albeit to differing degrees for different brand types.

2.5. Discussion

Study 1's pattern of results suggests that consumers share schemas regarding how merchants place different brand types on a shelf. These expectations reflect that popular brands should be in the middle and flanked by store brands that the retailer favors, that premium brands should be on top rows, cheapest brands on bottom rows, and that promoted products should be on the extremes. Results clearly indicate that consumers hold shelf space schemas regarding centrality (Valenzuela and Raghurir 2009), the meaning of vertical positions (higher is better), and promoted brands being at the extremes (Inman et al. 1990). Study 2 tests whether the spatial schemas documented in Study 1 are reflected in actual retail displays.

3. Study 2

The purpose of this study is to examine whether retailers' actual shelf space layouts match those expected by consumers. Study 2 represents a field study of various US retail supermarket shelves in different locations. To ensure that data findings can be generalized, four categories of products are examined. Choice of these categories was based on the following criteria: categories that students frequently purchase and use, and categories that have a limited amount of SKUs, to ease comparison across layouts.

3.1. Method

Three assistants, blind to the hypotheses, collected data in eight supermarket chains in two major metropolitan areas of the United States for four frequently purchased consumer products: cookies, pasta sauce, toothpaste and soda drinks leading to a sample size of 32 shelf layouts (8 stores x 4 categories). The assistants used planograms to record brand names, prices, and whether the brand was on promotion for every shelf position to examine placement of cheap, expensive and promoted brands. Reports from MarketResearch.com provide market shares of top brands in each category (where available) at the time of data collection to examine which brands are the most popular in each category.

3.2. Results

3.2.1. Brand price level: Verticality

Research assistants recorded the actual price (or discounted price if on promotion) of brands by brand position (top = 1, left = 1). The maximum number of rows in the data set is 9 and the maximum number of columns is 22. Analysis eliminated outliers, that is, positions that have fewer than 10 observations, thus, data analysis reflects prices of modal store displays with 5 rows and 7 columns for cookies, 6 rows and 7 columns for pasta sauce, 5 rows and 10 columns for soda, and 7 rows and 7 columns for toothpaste. Each observation is coded in terms of its row position, column position, as well as store, geographical area, and product category dummy. The usable sample numbered 781 price observations (East Coast $n = 506$; West Coast $n = 275$). Figure 1 displays price means by category.

The regression of actual prices using row and column position together with the store and category dummies is significant ($F(10, 780) = 64.96, p < .001, R^2_a = .50$). The regression shows a negative coefficient associated with the row effect ($\beta = -.10; t = -4.11, p < .001$), which is consistent with consumers' verticality schema (top rows have higher prices). The regression also

shows a negative coefficient associated with the column effect ($\beta = -.05$; $t = -3.09$, $p < .001$). The category dummies are also significant (β s = $-.28$ pasta sauce, -1.77 soda, $-.26$ cookies; t s = -2.89 , -16.84 , and -2.06 ; all $p < .05$), as are those associated with most stores. A second regression incorporating squared terms for both column and row effects checked for quadratic effects; no squared terms are significant.

Figure 1 here.

The same regression for each of the product categories separately shows significant effects (cookies: $F(9, 103) = 3.96$, $p < .001$, $R^2_a = .25$; pasta sauce: $F(9, 231) = 23.83$, $p < .001$, $R^2_a = .46$; soda: $F(9, 211) = 75.97$, $p < .001$, $R^2_a = .77$; toothpaste: $F(9, 211) = 14.74$, $p < .001$, $R^2_a = .37$). There is a significant linear row effect for pasta sauce ($\beta = -.18$; $t = -3.63$, $p < .001$) and toothpaste ($\beta = -.19$; $t = -5.52$, $p < .001$), both consistent with the verticality schema (prices decreasing from top to bottom), and significant column effects for cookies ($\beta = -.11$; $t = -2.13$, $p < .001$) and pasta sauces ($\beta = -.20$; $t = -4.57$, $p < .001$). Most individual stores dummies were significant for all four categories.

To more fully examine the heterogeneity in price formats, the regressions are rerun separately by type of store: upscale (Whole Foods), discount (Longs), mid-size (Shop Rite, Stop and Shop, Albertsons) and large (Path Mark, Safeway, Waldbaum's). All four models are significant (upscale: $F(5, 49) = 2.73$, $p < .05$, $R^2_a = .22$; large: $F(5, 347) = 41.26$, $p < .001$, $R^2_a = .37$; mid-size: $F(5, 296) = 43.27$, $p < .001$, $R^2_a = .42$; discount: $F(5, 69) = 40.46$, $p < .001$, $R^2_a = .70$). In the case of large supermarkets, both the row ($\beta = -.08$; $t = -1.98$, $p < .05$) and column ($\beta = -.05$; $t = -1.92$, $p < .05$) coefficients are significant and have negative coefficients, consistent with consumers' verticality schema (H1a). Data for mid-size supermarkets also shows a significant

row effect with a negative coefficient reflecting the verticality schema ($\beta = -.15$; $t = -5.02$, $p < .001$), with most category dummies significant. A smaller sample of upscale and discount stores does not show a significant row effect, but the coefficients are in the right direction as suggested by the verticality schema that higher priced items are placed in top rows ($ts = -.94$ and $-.93$ for upscale and discount respectively, $ps > .10$). More simply stated, stores appear to place higher priced products in top (vs. bottom) rows as per the verticality schemas.

3.2.2. *Brand characteristics: Popularity.*

The study presents results by product category to examine whether a similar set of rules govern the placement of products across a range of retailers. Planogram data merged with market share data identifies the following for each store:

1. The number of shelves used in a product category display
2. The number of horizontal shelf facings in each row
3. The total number of product facings (excluding ancillary products)
4. The number of facings of the top market share brands
5. A qualitative description of the position(s) occupied by the top four brands.

Table 2 here.

Table 2 summarizes the percentage of central positions occupied by the top four market share brands in the industry, by product category. The market leader occupies as few as 17% of all horizontally central positions across product categories, though this percentage is category dependent (10% for pasta sauce vs. approximately 20% for the other three categories). The second highest market share leader only accounts for another 22.4% of central positions (ranging

from 12% for pasta sauce to 30.5% for toothpaste), and the third highest brand accounts for an additional 17%. On average, retailers do not place the most popular brands in the center.

3.2.3. *Brand characteristics: Promotional status and store brand placement.*

Table 3 shows results by product category for promoted brands. Across product categories, almost a third of all sale items are on either the left or right extreme of a display. However, results are product category specific. They are stronger in the category of toothpaste (over 60%) which has the lowest incidence of promotional activity, and weaker in the category of soda (around 16%) where almost half of the items are on sale. Thus, reality somewhat, but not entirely, supports consumer beliefs that promotional brands are on the ends of a display shelf.

Table 3 here.

Across categories and stores, there are few data points that show systematic patterns in the placement of store brands (H1cii). The pasta sauce category has the highest number of store brands (with five of the nine stores offering a private label). These occupy 21 positions (of the available 278), with as many as twenty of these next to well-known brands (Ragu, Classico and Barilla). Therefore, despite few data points, H1cii is supported.

3.3. *Discussion*

Surveys of store shelf layouts show no clear pattern regarding brand placement in the center of a horizontal display. Nevertheless, they provide evidence that retailers place more expensive products on top (vs. bottom), and promotional products on left or right extremes. In three of the four categories studied, the most popular brand is not placed in the middle of the display. Consequently, there is a dissonance between what consumers assume is the typical

placement for the most popular brand and retailers' layouts. There does not appear to be any evidence of a systematic tendency for retailers to order products left to right in terms of price.

Study 3 tests if consumers form beliefs about shelf positioning due to actual experience of retail shelf facings (even if misinterpreted) or independent of such exposure. Understanding when and why shelf positions are informative, and what they are informative of, not only speaks to the theoretical antecedents of why these effects occur but are also of importance to product and retail managers who may leverage them.

4. Study 3

Study 3 introduces a manipulation of the information value associated with a shelf space display by telling participants that products are either arranged by region of production or that retailers have arranged products to be consistent with consumer expectations.

4.1. Method

Study 3 uses a 2 (information value of position: low/ high) x 2 (orientation: horizontal/ vertical) x 5 (position), mixed design with the first two factors manipulated between-subjects. Participants (n = 72) first read a short story about wines from Turkey based on information from the website www.turkeytravelplanner.com:

“Good wine has been produced in Turkey for millennia, and still is. The peoples of the Byzantine Empire enjoyed their wines and developed careful cultivation methods for their grapes. With the fall of the empire (1923) and founding of the European-style Turkish Republic, many citizens of Greek heritage moved to Greece, but in the secular republic wine-making was encouraged.

*Both **Tekel**, the government-owned monopoly company, and a few favored vintners such as **Kavaklidere**, produced simple table wines. Imported wines were rare, and very expensive because of high import duties. Simple table wines such as **Kavak** and **Çankaya** (white), **Dikmen** (red), **Lâl** (rosé/blush) and **Villa Doluca** (white and red) are drinkable and not expensive (US\$6 to \$9), but because discerning (and wealthy) Turkish wine-drinkers are only a small market, the better vintages are **surprisingly expensive** (US\$10 to \$18 and up). **High taxes** of YTL3.28 per bottle also play their part in the high price of wine. The tax just about doubles the cost of a bottle of inexpensive table wine.”*

In the high information value condition, participants read: *“Retailers pay careful attention placing wines in such a manner as to be consistent with consumer expectations and reduce the number of customer-service questions.”* In the low information value condition, they read: *“Brands are ordered alphabetically depending on the name of the geographical region where they are produced.”* To confirm that the manipulation worked, participants indicated whether they believe that Turkish convenience stores arrange brands of wine by geographical region (True/ False/ Don’t know).

Participants are asked to choose from an array of Turkish wines, which follow either a horizontal or vertical layout. Under the premise that they worked in a store analogous to Study 1, their task is to arrange a set of Turkish wines at five different price points (\$6, \$8, \$10, \$12, and \$15) in a 5x5 (row x column) array. They are to allocate three to seven slots for each price point. This measure tests whether consumers believe a certain order exists in which information about prices should be displayed. These beliefs represent verticality and horizontality shelf space schemas. The instructions read:

“For a variety of reasons, the prices of the wines are not to be displayed and the store essentially deals with tourists who do not know a lot about Turkish wines. Your goal is to help them make the selection that is best for them – that is, those who are looking for a cheap wine are most likely to choose that one, and those that are looking for an expensive one are most likely to make their best choice.”

4.2. Results

4.2.1. Manipulation Check

Participants in the low information value condition believe that wines in Turkish convenience stores are arranged by region (50%) to a greater extent than those in the high information value condition (22%, $\chi^2_2 = 6.95, p < .05$), indicating a successful manipulation.

4.2.2. Preferences

A multinomial logit regression with choice of position as the dependent variable, and information value, orientation, and their interaction as independent variables shows a significant main effect of information value ($\chi^2_4 = 13.06, p < .001$), as well as a significant information value by orientation interaction ($\chi^2_4 = 15.19, p < .001$).

In the horizontal orientation, when order is presumed to reflect retailer layout as per customer expectations, the center effect in horizontal choice replicates (Middle = 61.5%). However, when consumers believe that brands are ordered by geographic region, all positions are equally likely to be chosen (Center = 20%; $\chi^2_4 = 9.91, p < .05$).

In the vertical orientation, the pattern is different. When study participants believe that shelf layouts reflect retailers’ expectations of customers’ beliefs, they exhibit a higher than chance preference for the center row (38.9%). However, when participants believe wines are arranged by geographical region, consumers’ preference shift from the middle row to the top row

(60%, $\chi^2_4 = 9.77, p < .05$). That is, even when order has no information value, the position of a product on a shelf display still affects choice.

4.2.3. *Stocking Decision*

A 5x5 (row by column) ANOVA on the price point assigned to each cell replicates the verticality, top to bottom effect: a main effect of columns ($F(4, 164) = 3.17, p < .001$, Linear $F(1, 41) = 4.09, p < .05$). Results also confirm a main effect of rows reflecting that higher price points are assigned to right hand columns ($F(4, 164) = 4.52, p < .001$; Linear $F(1, 41) = 5.21, p < .05, n = 42$ for this measure due to partial non-response; see Table 4). No evidence exists from Study 2 that prices are actually arranged in higher order from left to right in the retail environment, suggesting that this inference does not reflect retailer reality. No interactions are significant.

Table 4 here.

5. **General Discussion**

This paper examines the beliefs and schemas consumers hold about the marketplace. The main thesis of the paper is that consumers expect retailers to order product alternatives using meaningful criteria such as price, popularity, and promotional status. The studies test whether retailer shelf space layouts reflect consumer beliefs and find inconsistent evidence for different beliefs. Across a field study encompassing two different geographical areas, eight stores and four product categories, findings show that while consumers assign the central position to the most popular product, retailers do not place the highest market share brand in that position. These findings illustrate how consumers' beliefs about shelf space layouts are not always reflected in the real marketplace.

The studies also show that consumers hold beliefs about price information based on vertical and extreme positions: more expensive products are located at the top and promotional products are on the extremes of the layout. These beliefs appear to be based on retailer reality although support is not always consistent across stores and categories. Based on these schemas about product positions in a shelf space layout, consumers may infer information about a product, especially when they do not have alternative individuating information about it.

The disparity between consumers' beliefs and actual retailer organization has implications for consumers' shopping experiences. The literature shows that when consumers find schema-consistent information they tend to use simple heuristics or prior beliefs instead of engaging in more analytical processing (Sujan, Bettman and Sujan, 1986). If consumers hold specific beliefs about the meaning of position in shelf space layouts, they may use these heuristics to make inferences about products based on their positions (McArthur and Post, 1977). However, when they encounter information contrary to their beliefs, consumers may experience adverse effects. As such, they may assess their shopping experience as difficult, generating feelings of frustration (Meyers-Levy and Tybout, 1989) that not only lower satisfaction with their ultimate decisions but also lower the probability of finalizing a purchase and returning to that store again (Valenzuela, Dhar and Zettelmeyer, 2009). Additionally, heuristics may be applied incorrectly, possibly jeopardizing sales of certain quality brands that are placed in a disadvantageous vertical display position. This possibility remains an open research question. An alternative viewpoint could be that retailers benefit from the mismatch of consumer perception with retail reality if the mismatch drives consumers to pay more attention to the display and spend more time shopping.

To take advantage of consumers' schemas, product managers should be willing to pay a premium to have their brands occupy the best position in a layout according to a brand's intended

characteristic and pricing. Retailers should be able to use this information to negotiate with manufacturers for shelf-space benefits or promote brands that are not market leaders (as seen in Study 2). However, many other variables can affect retailers' decisions of how to optimize shelf-space arrangements and managers' strategies for shelf-space bargaining. These variables include management of store traffic flow, environmental manipulation (making some store areas warmer), promotion of new and higher margin items, and management of overall store or category image.

This paper also identifies how the mismatch between beliefs and actual store displays is larger for certain schemas than others. For example, the verticality schema appears to be a consciously held schema in consumers' minds. That is, consumers think retailers place higher priced items on top shelves, which, in fact, reflects retailer reality. In contrast, consumers place higher priced items on the right hand side of a display (Study 3), although they do not explicitly state a right-left ordering rule as a belief (Study 1) and there is no evidence for a right-left ordering in the marketplace either (Study 2). These findings suggest that a left-right (horizontal) schema may exist, but if so, this schema is outside of consumers' conscious awareness. Future research should examine the implications in terms of boundary conditions of consumers holding a schema that they seem unaware of and which is not based on retailer practice. If consumers are more conscious of the application of certain schemas than others in their judgments, they should be able to control them better, making them more malleable and resource-dependent. The authors suggest these questions as areas for future research.

5.1. Study Limitations and Areas for Future Research

While the current research demonstrates incongruence between consumer beliefs about shelf space assortments and actual retailer layouts, a few limitations exist. Though consumers

apply general rules for different positions in a retail context, shopping environments differ in the extent of distraction and stimulation they provide (e.g., aural stimuli, flashing lights, or other shoppers). One might ask if competing demands on a consumers' time ameliorate or exacerbate consumer beliefs.

Another question for future research is whether consumers' position schemas result in a strongly formed, resilient attitude about a brand or product. If the inferences drawn from shelf space positions are enduring, then a manufacturer may be able to inoculate their brand by paying a premium for a central or higher position for just a limited amount of time. Such an effect may imply positive consequences for a brand placed in the central position, much like the ability of a brand to withstand problems like product failures, scandals, or competitive entry by new brands. However, if research shows a weak effect, then the market might be driven to bearing higher permanent costs, with retailers leveraging this reality through their pricing of central and high shelf positions.

Finally, another limitation of the studies reported is that the current studies require participants to take different professional perspectives (retailer, product manager, advisor), but not the perspective of a regular consumer. If asked to do so, they might change their answers, albeit slightly, since their answers are supposedly representative of what they believe retailers, product managers and other advisors do at the point of sale. In conclusion, this research provides an initial attempt to document consumers' shelf space position beliefs, specifically those related to verticality, popularity and promotional status. The paper represents a start towards a systematic investigation of other beliefs that consumers have about the marketplace, including retailers' arrangements of products within a store environment.

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Table 1a: Study 1 Modal Placement (Percentage frequency): Product Manager Perspective

Brand Description	Ideal	2 nd best	Worst
H1ai: Premium	I3 (27.50%)	I4 (20.00%)	U5 (40.00%)
H1aii: Cheapest	U3 (13.75%)	O3 (15.00%)	U5 (16.67%)
H1bi: Popular	I3 (32.53%)	E3 (25.3%)	U5 (53.01%)
H1bii: Slow-Moving	I3 (14.46%)	I4 (13.25%)	U1 (31.33%)
H1ci: Promoted	I1 (12.20%)	I2 (12.20%)	U1 (29.27%)
H1cii: Store	I3 (28.92%)	E3 (16.87%)	U5 (33.73%)
Well- Known	E2 (16.87%)	I2 (12.05%)	U1 (29.27%)
New	I3 (16.05%)	E4 (13.58%)	U5 (31.25%)
Primary conclusions	Horizontal center positions preferred for all except the promoted brand		Extreme positions in bottom rows are least preferred.

Note: Coding scheme: the 5 rows are labelled A, E, I, O, and U from top to bottom shelves respectively; the 5 columns are labelled 1, 2, 3, 4, and 5 from left-most to right-most shelves respectively. Chance likelihood of one position being chosen = 1/25 or 4%.

Table 1b: Study 1 - Row Preferences by Type of Product

	Vertical Orientation					Overall	Contrast F	
	Top	Center			Bottom		Linear	Quadratic
	A	E	I	O	U	F*		
Cheapest	3.9	4.5	4.6	4.4	3.9	2.19	.03	5.08
Premium	4.2	5.4	5.6	3.6	2.1	53.51	55.86	76.31
Popular	4.3	5.5	5.8	3.9	1.9	79.28	77.93	111.91
Promoted	4.2	5.2	5.6	4.2	2.8	34.79	26.08	57.21
Store	4.2	5.4	6.0	3.7	2.3	66.83	49.47	106.22
Well- Known	4.2	5.3	5.7	4.2	2.8	40.41	26.19	85.64
New	4.0	5.3	6.0	3.9	2.5	55.90	33.17	112.41
Slow-Moving	4.2	5.1	5.4	3.9	2.7	35.27	28.14	62.36

Scale: 1=Not at all/ 7 = Very Preferred

Table 1c: Study 1 - Column Preferences by Type of Product

	Horizontal Orientation								
	Left		Center		Right		Overall	Linear	Quadratic
	1	2	3	4	5	F*			
Cheapest	4.4	4.7	5.2	4.5	4.0	5.66	1.89	8.70	
Premium	3.7	4.8	5.8	4.6	3.5	28.10	1.29	56.03	
Popular	4.0	4.7	6.1	4.7	3.6	32.36	1.58	55.66	
Promoted	4.3	4.9	5.1	4.5	3.9	6.29	3.78	10.06	
Store	3.9	5.0	6.0	4.6	3.4	33.10	4.02	70.79	
Well- Known	3.9	4.9	5.9	4.6	3.5	32.42	2.71	71.83	
New	4.3	5.1	5.6	4.8	3.7	17.18	3.91	36.53	
Slow-Moving	4.0	4.9	5.6	4.7	3.6	24.99	2.99	52.13	

Scale: 1=Not at all/ 7 = Very Preferred

* $p < .05$ for all F's except those in *italics*.

Table 1d: Study 1 - Modal Placement of Brand in a 5 x 5 shelf space array: Retailer Perspective

(% placing the brand in slot)	Left = 1	2	Horizontal Center = 3	4	Right = 5
Top = A	Premium (21%) Popular (20%)	Premium (23%) Popular (22%)	Premium (23%)	Premium (31%)	Premium (22%)
E	New (21%)	Premium (16%) Popular (19%)	Store (25%)	Premium (22%)	Store (20%)
Vertical Center = I	Promoted (17%) Store (18%)	Store (23%)	Popular (36%)	New (19%)	Promoted (21%) Store (23%)
O		Well Known (20%) Cheapest (20%)	Promoted (17%)	Well Known (19%)	Store (21%) Cheapest (23%)
Bottom = U	Slow moving (22%) Cheapest (24%)	Cheapest (34%)	Slow moving (29%) Cheapest (27%)	Slow moving (26%) Cheapest (35%)	Cheapest (28%)

Note: Percentage of any of the 8 products being placed = 12.5%. Sample sizes range from 50-78 for each cell due to partial non-response. **Bold** font denotes a percentage that is significantly different from chance at $p < .05$ for any given cell. **Bold italicized** font denotes $p < .10$.

Table 2: Study 2- Central Positions in Shelf Layouts: Summary Results of Observational Store Surveys

Product Category	Total Number of Facings occupied by		Total Number of Central Facings occupied by				
	All Stores	Horizontal Centre positions	Market Leader	2 nd highest	3 rd highest	4 th highest	Other brands in category
Pasta Sauce	249	50 (100%)	5 (10%)	6 (12%)	13 (26%)	8 (16%)	18 (36%)
Toothpaste	229	59 (100%)	12 (20.3%)	18 (30.5%)	12 (20.3%)	5 (8.5%)	12 (20.3%)
Chocolate Chip Cookies	117*	31 (100%)	6 (19.4%)	8 (25.8%)	2 (6.5%)	1 (3.2%)	14 (45.2%)
Soda (2 liter)	246	25 (100%)	5 (20%)	5 (20%)	1 (4%)		14 (56%)
Across categories		165 (100%)	28 (17%)	37 (22.4%)	28 (17%)		72 (43.6%)

* Note that chocolate chip layouts included product categories outside of chocolate chip cookies, such as other cookies, crackers etc., that are interspersed with chocolate chip cookies in the stores studied which may partially account for the high proportion of non-product category brands in the central positions. The same is true for the soda drinks (2 liter bottle) category, as other shelf positions involve other sizes (e.g., cans, 6-packs, 12-packs of cans, 1 liter bottles, etc.).

Table 3: Study 2- Sale Positions in Shelf Layouts: Summary Results of Observational Store

<i>Surveys</i>					
<i>Product</i>	<i>Total Number of Facings occupied by</i>		<i>Total Number of Sale Facings in</i>		
<i>Category</i>	Number of Extreme Left and Right Positions	Number on sale	Left Center Position	Right Center Position	Neither Left nor Right Center
Pasta Sauce	99	59	10	12	37
		(100%)	(16.95%)	(20.34%)	(62.71%)
Toothpaste	93	38	13	10	15
		(100%)	(34.21%)	(26.32%)	(39.47%)
Chocolate	49	70	13	14	43
Chip		(100%)	(18.57%)	(20.00%)	(61.43%)
Cookies					
Soda (2 liter)	47	151	13	11	127
		(100%)	(8.61%)	(7.28%)	(84.11%)
Across categories	288	318	49	47	222
		(100%)	(15.41%)	(14.78%)	(69.81%)

Table 4: Study 3 -Prices assigned to each cell in a 5x5 planogram

	Left		Center		Right
Row 1 (Top)	\$9.52	\$10.12	\$10.76	\$11.26	\$11.36
Row 2	\$9.95	\$10.31	\$10.88	\$11.48	\$11.67
Row 3 (Center)	\$9.81	\$10.38	\$10.81	\$10.81	\$11.12
Row 4	\$9.50	\$9.81	\$10.40	\$10.29	\$10.38
Row 5 (Bottom)	\$8.45	\$8.43	\$9.38	\$9.33	\$9.26

Figure 1: Study 2 – Mean Price per Item for Modal Row and Column positions

