Pierre Chandon, J. Wesley Hutchinson, Eric T. Bradlow, & Scott H. Young

Does In-Store Marketing Work? Effects of the Number and Position of Shelf Facings on Brand Attention and Evaluation at the Point of Purchase

Recent trends in marketing have demonstrated an increased focus on in-store expenditures with the hope of "grabbing consumers" at the point of purchase, but does this make sense? To help answer this question, the authors examine the interplay between in-store and out-of-store factors on consumer attention to and evaluation of brands displayed on supermarket shelves. Using an eye-tracking experiment, they find that the number of facings has a strong impact on evaluation that is entirely mediated by its effect on visual attention and works particularly well for frequent users of the brand, for low-market-share brands, and for young and highly educated consumers who are willing to trade off brand and price. They also find that gaining in-store attention is not always sufficient to drive sales. For example, top- and middle-shelf positions gain more attention than low-shelf positions; however, only top-shelf positions carry through to brand evaluation. The results underscore the importance of combining eye-tracking and purchase data to obtain a full picture of the effects of in-store and out-of-store marketing at the point of purchase.

Keywords: point-of-purchase marketing, merchandising, in-store decision making, attention, eye tracking

Marketers are diverting a growing proportion of their promotional budgets from traditional out-of-store media advertising to in-store marketing, and retailers are responding by adopting increasingly sophisticated shelf management and audience measurement tools (Egol and Vollmer 2008). It is well known that large increases in total shelf space (e.g., end-of-aisle displays) have strong effects on brand sales (e.g., Bemmaor and Mouchoux 1991); however, the evidence is less conclusive for in-store marketing changes that keep total category shelf space constant (e.g., more shelf facings, different shelf position). On the one hand, some studies have shown that the position of a brand in a vertical or horizontal retail display influences quality expectations and, thus, choices (e.g., Raghubir and Valenzuela 2008). On the other hand, the field experiments Drèze, Hoch, and Purk (1994) conducted led them to conclude that shelf position has a limited influence on brand sales and that additional facings have a limited impact after the minimum level necessary to avoid stockouts has been reached.

More important, prior research has not examined the effects of in-store marketing on visual attention and brand consideration (precursors of choice). Therefore, it cannot be determined whether the effects of in-store marketing on choice are mediated by enhanced attention and consideration or whether they influence choice directly (e.g., because of quality inferences). Examining multiple measures of attention and evaluation is made more important by the trend toward using the point of purchase as an advertising medium aimed at building brand awareness and image over the long run and not just as a distribution channel (Egol and Vollmer 2008). In this context, attention and consideration may provide more sensitive and reliable metrics of in-store marketing's effectiveness than choice. Finally, prior research has not manipulated in-store factors independently of brand- and consumer-specific out-of-store factors, and therefore it is not possible to compare the relative impact of in-store and out-of-store factors or to determine whether in-store factors are more effective for low- or high-market-share brands or for regular users or nonusers.

Therefore, the objective of this article is to examine the interplay between in-store and out-of-store factors on consumer attention to and evaluation of brands displayed on supermarket shelves. Drawing on research on shelf manage-

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ment effects and on eye movements in scene perception, we develop a framework to assess the effects of important in-store (e.g., the number and position of shelf facings) and out-of-store (e.g., past brand usage, the brand's market share, the consumer's demographics and shopping goals) factors on attention and evaluation. We test the predictions derived from this framework in an eye-tracking experiment in which we manipulate or measure these factors for established and new brands with no out-of-store history in the United States in two product categories (soaps and pain relievers). Then, we estimate the effects of these factors on visual attention, visual reexamination, recall of visual attention, brand consideration, and brand choice for a large sample of representative U.S. shoppers exposed to life-size pictures of supermarket shelves. Finally, we use path analysis to decompose the total effects on evaluation into the direct effects (after controlling for attention) and the indirect effects (mediated by attention).

This research provides new insights into four of the five issues that deserve further research, as identified in Wedel and Pieters's (2008) review of the eye-tracking literature: (1) studying the interplay between bottom-up salience and top-down expectations in guiding attention, (2) examining eye movements using marketing stimuli other than print advertisements, (3) testing different attention metrics, and (4) investigating the relationship between attention and downstream marketing effects, such as purchases. In particular, we show that out-of-store factors directly influence evaluation and are not mediated by attention, whereas in-store factors primarily influence attention and, through that route, evaluation but do not always carry through to evaluation because of conflicting direct effects on postattention evaluation.

This research also contributes to the effort to develop better marketing metrics that include attention (Pechmann and Stewart 1990). We find that self-reported recall of visual attention is not a valid proxy for actual visual attention to brands in a supermarket shelf display. This raises doubts about the validity of audience measurement tools and academic studies using memory to infer exposure. More generally, we find that marketers might misunderstand the effects of in-store and out-of-store marketing if they only relied on self-reported attention or evaluation measures and that they need to combine a rich set of indicators of these two stages of the decision-making process. For example, our finding that brands influence both attention and evaluation given attention suggests that a complete measure of a brand's equity should combine eye-tracking and purchase decision data.

For managers, our main result is that all shelf-space actions are not equal. We show that the number of facings has a consistent and positive effect on attention and, through attention, on evaluation and that its influence on choice is particularly strong for regular users, for low-market-share brands, and for young and highly educated shoppers who value both brands and low prices. In contrast, the effects of shelf position are mixed. Positioning brands on the top shelf and near the center of a shelf improves both attention and evaluation, but positioning them on the middle shelves helps attention without improving evaluation. Positioning them on the left- or right-hand side of the shelf makes no difference to either attention or evaluation.

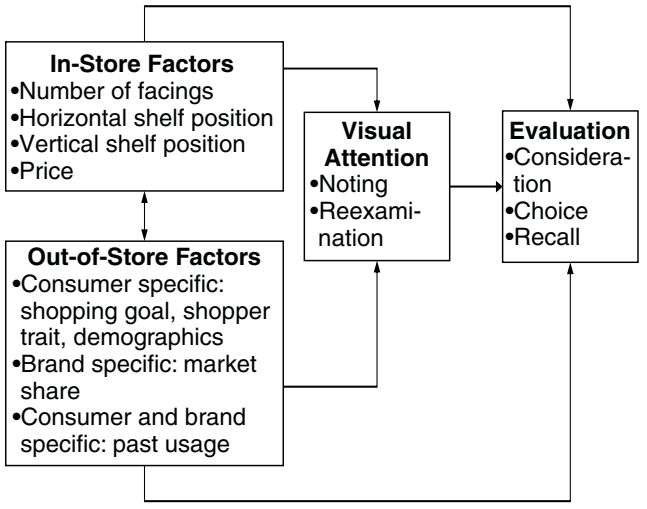
Attention and Evaluation at the Point of Purchase

We organize the literature review and the hypothesis development according to the framework in Figure 1. In this framework, we distinguish between visual attention and higher-order stages of the decision-making process (summarized as "evaluation"). The framework also summarizes the in-store and out-of-store factors that influence attention and evaluation. We examine these two characteristics of the framework in separate sections. In the first section, we review the eye-movement literature in psychology and marketing to support the distinction between attention and evaluation and their measurement. In the second section, we review the marketing literature to derive hypotheses about the main and interaction effects of the key in-store and out-of-store factors (see Figure 1) on attention and evaluation.

Attention Versus Evaluation: Insights from Eye-Movement Studies

The distinction among recall, consideration, and choice is well established in the information-processing and decision-making literature streams (e.g., Alba, Hutchinson, and Lynch 1991). In contrast, few studies have examined visual attention, and some studies actually use recall as a proxy for attention (e.g., Barlow and Wogalter 1993; Raghubir and Valenzuela 2006; Shaw et al. 2000). In this section, we review the key findings of the literature on visual attention in scene perception and its applications in marketing. These studies show how people visually process complex commercial scenes, how visual attention can be measured with eye-movement data, and why it is important

FIGURE 1
Drivers of Attention and Evaluation at the Point of Purchase



to distinguish between attention and the more evaluative measures of recall, consideration, and choice.

Eye movements in scene perceptions. There is a broad consensus on the following aspects of how people visually process scenes (Henderson and Hollingworth 1999; Pieters and Wedel 2007; Rayner 1998; Wedel and Pieters 2008): What appears as smooth and conscious eye movements actually consist of eye fixations (during which the eye remains relatively still for approximately 200–500 milliseconds) separated by rapid jumps, called saccades, that average 3–5 degrees in distance (measured in degrees of visual angle), last 20–40 milliseconds, and during which no information useful for scene perception can be acquired. Fixations serve to project a small area of the visual field onto the fovea, an area of the eye with superior visual acuity (which corresponds to approximately twice the width of one's thumb at arm's length). In natural complex scenes, such as supermarket shelves, eye fixations are necessary for object identification, and therefore their location is a good indication of visual attention.

Eye-movement studies have also shown that the "gist of the information" about a scene can be extracted preattentively and from peripheral vision during the initial fixation (Henderson and Hollingworth 1999). People can identify the semantic category of the scene (e.g., a supermarket shelf), its spatial layout (e.g., there are four shelves), and the level of clutter during the first eye fixation. Greater levels of detail for a given object (e.g., brand name) require a fixation centered on that object. In applied eye-movement studies, the first fixation on an object is known as "noting," and the second is known as "reexamination." Therefore, noting is based on a combination of prior ("out-of-store") knowledge and of the ("in-store") low-level visual characteristics of the objects in the scene gathered from prior fixations on other objects. In contrast, reexamination is influenced more by the informativeness of the object for the task at hand (e.g., brand preferences, if the goal is consideration or choice).

Finally, eye-tracking studies have shown that eye fixations, but not peripheral vision, increase memory for the fixated object (Loftus, Hoffman, and Loftus 1999; Pieters, Warlop, and Wedel 2002). Conversely, Pieters and Wedel's (2007) extensive review of the eye-movement literature concludes that people mostly experience smooth, uninterrupted vision and that they are not aware of their own eye fixations. This suggests that recall of attention is essentially the same as recall of brand names in terms of the underlying cognitive process (Hutchinson, Raman, and Mantrala 1994). This is why in our framework we placed recall with consideration and choice among the measures of brand evaluation and not among the measures of visual attention.

Eye-movement studies in marketing. Most eye-tracking research in marketing has been done in an advertising context (for a review, see Wedel and Pieters 2008), and only a few have examined visual attention to supermarket shelves. Among these, Russo and Leclerc (1994) use sequences of consecutive eye fixations to identify three stages of in-store decision making: orientation, evaluation, and verification. Pieters and Warlop (1999) show that time pressure and task motivation influence visual attention to the pictorial and textual areas of unfamiliar brands displayed on supermarket shelves. Chandon and colleagues (2007) empirically decompose a brand's observed consideration level into its memory-based baseline and the "visual lift" caused by in-store visual attention. They also find that noting and reexamination are only weakly correlated with brand consideration, confirming that the two constructs are empirically distinct. Finally, Van der Lans, Pieters, and Wedel (2008) find that bottom-up factors (package brightness and color) are twice as important in determining the speed of brand search as the top-down factor of being the target of the search task or not.

Overall, eye-tracking studies in marketing have demonstrated the value of measuring attention, and not just evaluation, to better understand how people visually process commercial scenes and to measure the effectiveness of visual marketing stimuli. However, these studies have not specifically examined the effects of the number of facings or the effects of alternative shelf placements on both attention and evaluation, nor have they used multiple measures of these constructs. With one exception (Chandon et al. 2007), they have considered relatively small, simple displays with few brands and only one facing per brand. More important, their experimental designs do not enable them to disentangle in-store effects from out-of-store effects, such as past brand usage. Therefore, our main contribution is to provide a more thorough and methodologically rigorous analysis, especially in assessing the extent to which various effects on attention carry through to consideration and choice. In addition, the use of multiple measures of both attention and evaluation enables us to examine whether recall of brand attention is a good proxy for attention and, thus, a substitute for eye-tracking data—an issue of significant importance for the future design of in-store experiments and managerial practice.

In-Store and Out-of-Store Effects at the Point of Purchase

We define in-store factors as factors that cannot influence consumers without in-store visual attention. The in-store visual factors reviewed in Figure 1 correspond to the basic shelf management decisions that retailers can make for any given brand, while keeping the total space devoted to the category constant. They include the number of facings of the brand, its vertical position in the display, its horizontal position on the shelf, and its price. Out-of-store factors are factors that cannot influence consumers without memory activation. As Figure 1 shows, these factors are consumer specific (shopping goal, purchase criteria, and demographics), are brand specific (market share), or vary across both brand and consumers (past brand usage). In this section, we draw on existing research to develop hypotheses about the effects of each set of factors on attention and evaluation.

In-store factors. All eye-movement studies of advertising or catalog displays show that visual area strongly increases attention (Janiszewski 1998; Lohse 1997). Several shopper surveys (Inman, Winer, and Ferraro 2009) and field experiments (Chevalier 1975; Curhan 1974; Inman and McAlister 1993; Wilkinson, Mason, and Paksoy 1982) have

shown that large increases in shelf space increase brand sales even when the price and location of the products remain unchanged (for a review, see Campo and Gijsbrechts 2005). Drèze, Hoch, and Purk (1994) study the brand sales impact of an increased number of facings, while holding the total space allocated to the category constant. They find significant effects of increasing the display area between 3 and 15 square inches but not beyond.[1] Therefore, we expect that increasing the number of facings has a positive but marginally diminishing effect on both brand attention and evaluation but a stronger effect on attention than on evaluation. For this reason, we expect that most of the effect on evaluation is mediated by attention. Still, because consumers believe that important brands are given precedence in retail displays (Buchanan, Simmons, and Bickart 1999), a high number of facings should also have a positive direct effect on evaluation through inference (controlling for attention).

Eye-movement studies also suggest that not all shelf locations attract equal attention. Chandon and colleagues (2007) find that the brands located near the center of two shelf displays were noted more often but were not considered more often. They speculate that this occurs because the first fixations tend to be in the center of a scene and because people fixate on the center to orient their attention when transitioning between different locations of a scene. However, because they do not manipulate shelf location independently of brand, their results may be driven by brand effects rather than by location effects. All the other studies of brand location effects examine consumer choice or brand sales. Drèze, Hoch, and Purk (1994) find strong effects for vertical position, in which the best level is near the eye or hand levels (i.e., near the top shelves) and the worst level is the lowest shelf. In contrast, they find weak effects for the horizontal position on the shelf, and these effects do not hold across all the categories. A related stream of research examines the effects of the position of products in horizontal or vertical arrays (i.e., one single row or column) of products. Christenfeld (1995) finds that when multiple packages of identical products are available side-by-side on a supermarket shelf, people tend to choose the middle product. Shaw and colleagues (2000) replicate these results and argue that they occur because center positions receive more attention (though this claim is based on recall data and not on direct measures of attention). In contrast, Raghubir and Valenzuela (2006) argue that position effects are not mediated by attention but rather by quality inferences, and they provide support for their hypothesis in the context of the evaluation of the performance of students or game show contestants depending on where they are seated. In a subsequent study, Raghubir and Valenzuela (2008) find that consumers believe that retailers place expensive, high-quality brands on the top shelves and cheaper brands on the bottom shelves but are uncertain as to what criteria retailers use to order brands from left to right. They find that when choosing among unfamiliar wines, people tend to choose the brands located at the top or in the middle of vertical displays and the brands located in the center of horizontal displays.

Therefore, we expect that brands positioned near the center of the shelf will receive more attention than brands located in either the vertical or the horizontal extremities of the display. Because of the vertical position inferences, we expect a positive direct effect on evaluation of a position on the top shelves. Thus, we expect that a middle vertical position helps attention and, through attention, evaluation, but it has a negative direct effect (relative to the top as baseline) on evaluation because people believe that the best products are placed on the top shelves. Based on the literature, we make no specific prediction about the effects of a product being on the left- or right-hand side of the shelf on attention or evaluation. Finally, because of the strong evidence for position-based inferences (especially regarding vertical position), we expect that the position of facings (unlike their number) has a direct effect on evaluation and that their effect on evaluation is not entirely mediated by attention.

The price of the brand posted on the shelf is a combination of the brand's regular price and temporary price reductions. Predicting the effect of shelf price on attention is difficult because all price information is potentially relevant. For evaluation, price should have a negative impact on choice but a positive impact on recall and consideration because it is a signal of quality.

Out-of-store factors: main effects and interaction with in-store factors. Recent research on in-store decision making has shown that most of the variance can be accounted for by out-of-store factors rather than in-store factors, particularly by individual shopping traits and strategies (Bell, Corsten, and Knox 2009; Inman, Winer, and Ferraro 2009). In a large-scale study, Bell, Corsten, and Knox (2009) find higher levels of self-reported, unplanned category purchasing among consumers who were not focused on fast and efficient buying, in support of prior findings that consumers who enjoy shopping and browsing are more likely to make buying decisions in the store (Beatty and Ferrell 1998). They also find higher levels of unplanned category purchasing among higher-income and younger consumers, which is consistent with prior findings of higher unplanned buying among educated consumers (Wood 1998). These results lead us to expect that younger and more educated consumers, consumers who are not focused on fast and efficient buying, and consumers who are willing to trade off multiple purchase criteria (rather than follow a single price or brand-based rule) will show higher levels of attention and evaluation and will be more influenced by in-store marketing.

We now turn to out-of-store factors that vary across brands (market share) or across brands and consumers (past brand usage). Bemmaor and Mouchoux (1991) find that promotional end-of-aisle displays are more effective for low-market-share brands than for high-market-share brands. This is because, regardless of consumers' individual brand preferences, high-market-share brands advertise more, are more accessible in memory, and thus gain less from added in-store visual salience (Fazio, Powell, and Williams 1989; Nedungadi 1990). Pechmann and Stewart (1990) find that

[1]Because most brands in the categories they study had display sizes of approximately 15 square inches, Drèze, Hoch, and Purk (1994) conclude that there was virtually no additional sales potential of increasing the number of facings beyond their current level. We return to this issue in the "General Discussion" section.

people spend more time looking at magazine advertisements for high-market-share brands than for low-market-share brands. Therefore, we expect that attention and evaluation will be higher for high-market-share brands and that in-store factors will have a stronger impact on low-market-share brands. When differences in brand awareness and accessibility are accounted for (through the market share measure), past brand usage is an indicator of consumer preferences. We expect that as with other top-down factors, preferences will increase attention and evaluation. We also expect that past usage will increase the effects of in-store factors because consumers are unlikely to choose a brand that they have never used before, even if in-store marketing draws their attention to this brand, because such brands are likely to have been "permanently" eliminated from consideration. New products are a possible exception because absence of past usage does not necessarily indicate rejection.

Finally, we expect that unlike in-store factors, which primarily influence attention, out-of-store factors influence evaluation and have only a marginal effect on attention. Therefore, we expect that most of the effects of out-of-store factors on evaluation are direct and not mediated by attention. For the same reason, we expect to find stronger interactions between in-store and out-of-store factors for evaluation than for attention. We tested all these hypotheses in an eye-tracking experiment in which we manipulated, for each brand in two categories, the in-store factors (shown in Figure 1), manipulated or measured the out-of-store factors, and measured participants' attention to and evaluation of all displayed brands.

Eye-Tracking Experiment

Design and Stimuli

As we show in Figures 2 and 3 and describe in more detail in the Web Appendix (see http://www.marketingpower.com/jmnov09), we created a fractional factorial design that enabled us to test the effects of the number and location of shelf facings independently of any brand-specific effects using 12 planograms.[2] To test for diminishing sensitivity, we used three levels for the number of a facings manipulation (4, 8, or 12 facings, corresponding to approximately 45, 90, and 135 square inches in the picture). We used four levels for the vertical position of the brands (first, second, third, and bottom shelf) and four levels for their horizontal position (far-left, center-left, center-right, and far-right shelf). To create between-subject variation in prices, the brand's shelf price was either the regular price at the time of the study or discounted by approximately 23%. Additional analyses reported in the Web Appendix show that the fractional factorial design enables us to uniquely identify the main effects of in-store factors and their interaction with out-of-store factors and that these effects are not confounded with brands.

[2]"Planogram" is the retailing term for a diagram that specifies, usually for a particular product category, the location and number of facings for each stockkeeping unit.

Participants randomly viewed 1 of the 12 planograms for each of two categories (soap and pain relievers), and we counterbalanced category presentation order across participants. As we report in the Web appendix (see http://www.marketingpower.com/jmnov09), category order only influences average recall because of a recency effect, and thus we do not discuss it further. We also manipulated the shopping goal of the participants (between subjects) by giving them either a brand choice or a consideration task before they looked at the displays. This manipulation enabled us to determine whether the measurement of consideration (online versus retrospective) would create any biases. It also provided us with an opportunity to test the robustness of prior findings on the effects of in-store marketing when consumers either are focused on buying a single brand or are simply browsing. There were a total of 48 experimental cells (12 planograms × 2 two shopping goals × 2 category order conditions).

The stimuli were shelf displays of bar soaps and pain relievers. We chose these categories because of their high penetration level and because the packages of all the brands in these categories use the same "brick" design. This minimizes the possibility that people recognize the brands without eye fixation and increases the effectiveness of our manipulation of in-store factors. It also ensures that brand is not confounded with package shape or size. We selected the

FIGURE 2
Planogram 1 for Soaps (Top) and Planogram 11 for Pain Relievers (Bottom)

FIGURE 3
Planogram Design and Coding

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_1	10[a]	11[a]	11[a]	6	6	6
Shelf 2		12	12	12	4	5[a]	5[a]
Shelf 3		9[a]	9[a]	9[a]	2	2	1[a]
Shelf 4		8	8	7	3[a]	3[a]	3[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_7	4	5[a]	5[a]	12[a]	12[a]	12[a]
Shelf 2		6	6	6	10[a]	11	11
Shelf 3		2[a]	2[a]	1	9[a]	9[a]	9[a]
Shelf 4		3	3	3	8	8	7a

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_2	11[a]	11[a]	11[a]	3[a]	4	4
Shelf 2		9[a]	10	10	5	5	5
Shelf 3		7[a]	7[a]	6	2	2	2
Shelf 4		8[a]	8[a]	8[a]	1[a]	1[a]	12

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_8	3	4[a]	4[a]	11	11	11
Shelf 2		5	5	5	9	10[a]	10[a]
Shelf 3		1	1	12[a]	8[a]	8[a]	8[a]
Shelf 4		2[a]	2[a]	2[a]	7	7	6[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_3	9	9	8[a]	4[a]	4[a]	4[a]
Shelf 2		10[a]	10[a]	10[a]	3	3	2[a]
Shelf 3		5	6[a]	6[a]	1	1	1
Shelf 4		7	7	7	11	12[a]	12[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_9	4[a]	4[a]	4[a]	8[a]	9	9
Shelf 2		3	3	2[a]	10	10	10
Shelf 3		12[a]	12[a]	11	7	7	7
Shelf 4		1[a]	1[a]	1[a]	5	6[a]	6[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_4	9	9	9	2	2	1[a]
Shelf 2		8[a]	8[a]	7	3[a]	3[a]	3[a]
Shelf 3		6[a]	6[a]	6[a]	10	11[a]	11[a]
Shelf 4		4[a]	5	5	12	12	12

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_{10}	3	3	3	8	8	7a
Shelf 2		1	2[a]	2[a]	9[a]	9[a]	9[a]
Shelf 3		12	12	12	4	5[a]	5[a]
Shelf 4		11	11	10[a]	6[a]	6[a]	6[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_5	7	7	6[a]	2	2	2
Shelf 2		8[a]	8[a]	8[a]	1[a]	1[a]	12
Shelf 3		5	5	5	9	10[a]	10[a]
Shelf 4		3[a]	4	4	11[a]	11[a]	11[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_{11}	12[a]	1[a]	1[a]	8[a]	8[a]	8[a]
Shelf 2		2	2	2	7	7	6[a]
Shelf 3		11	11	11	4[a]	4[a]	3
Shelf 4		9	10	10	5[a]	5[a]	5[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_6	7[a]	7[a]	7[a]	12	12	11
Shelf 2		6	6	5[a]	1[a]	1[a]	1[a]
Shelf 3		2[a]	3[a]	3[a]	10	10	10
Shelf 4		4	4	4	8	9	9[a]

		Far Left		Center Left	Center Right		Far Right
Shelf 1	P_{12}	12[a]	12[a]	11[a]	7[a]	7[a]	7[a]
Shelf 2		1	1	1	5	6	6
Shelf 3		8	9	9	4	4	4
Shelf 4		10[a]	10[a]	10[a]	3[a]	3[a]	2[a]

[a]Indicates that the price of the brand was discounted.
Notes: Each number represents a block of 4 facings. For soap, Numbers 1–12 are Dial, Ivory, Coast, Dove, Caress, Safeguard, Simple, Shield, Zest, Olay, Irish Spring, and Lever. For pain relievers, Numbers 1–12 are Nurofen, Bayer, Advil, Anacin, St. Joseph, Motrin, Tylenol, Aleve, Ecotrin, Wal-Proxen, Excedrin, and Bufferin.

top 11 brands in each category based on their U.S. market share and added a 12th brand (intentionally) that was unknown to participants. For this, we used two European brands: Simple soap and Nurofen pain relievers, which were not available in the United States. As Figure 2 shows, we used only the best-selling stockkeeping unit per brand (i.e., size and form) so that simple verbalized names would unambiguously identify the brands chosen and considered in our task.

The prices of the other brands were the average regular prices of these products in two major food store chains at the time of the experiment. The prices of the two new brands were determined during pretests to position them as regional or store brands. Prices in the sale condition were discounted by an average of 23% (consistent with practice) but were not marked in any special way (i.e., no "shelf talkers"). This was done to avoid confounding the effects of the price discount with the effects of in-store signage. As Figure 3 shows, and

as the Web Appendix details (http://www.marketingpower.com/jmnov09), we manipulated price between subjects following a Latin-square design. In each planogram, and for each participant, half the brands were on sale, and half were priced at their regular level. To increase the face validity of the stimuli, we rounded prices to the nearest nine-ending number.

Procedure

The data used in our analyses were collected in collaboration with Perception Research Services Inc. using the procedure and stimuli typically used in commercial tests of package designs. We recruited 384 adult shoppers (8 per experimental design cell) in shopping centers in eight U.S. cities and offered them $10 for their participation. They were heads of households responsible for the majority of their household's grocery shopping. Their ages ranged from 24 to 69, they had at least a high school education, and they earned a minimum annual income of $25,000. We eliminated 20 participants because of a technical problem and 16 participants who did not fill out the questionnaires completely. Because 4 participants provided eye-tracking data for only one category, we have 8304 observations (24 brands for 344 participants and 12 brands for 4 participants).

Participants were seated and told that they would see a series of products like those found in stores. Their eye movements were tracked using infrared corneal reflection, which does not require headgear. The eye-tracking equipment recorded the coordinate of the fovea with a frequency of 60 readings per second and, from this information, identified when the eyes were still (which identifies a fixation) and measured the duration of these fixations and the coordinates of the fovea during these fixations. It then mapped the coordinates of the fovea to the position of each area of interest on the picture (e.g., individual brands).

Participants went through a calibration procedure that required them to look twice at a blank picture with five circles projected on a 4 × 5-foot screen placed approximately 80 inches in front of them. After completing the calibration procedure, they were told that they would look at two pictures of supermarket shelves. In the choice goal condition, the research assistant asked the participants, "Tell me the name of the one brand that you would buy." In the consideration goal condition, the research assistant asked the participants, "Tell me the names of the brands that you would consider buying." In both conditions, participants were told to press a button immediately after they finished the task. Pressing this button blanked the screen and enabled us to record the total time spent making the decision.

Attention measures. The eye-tracking measures available for each participant and category are the total time spent looking at the picture and the position and duration of each eye fixation. Following the standard procedure in eye-tracking research, we eliminated fixations that lasted less than the 50 milliseconds required for information acquisition in complex visual scenes perception (Van Diepen, De Graef, and d'Ydewalle 1995). The position of the eye fixation shows whether the participant fixated on the package or on the price tag area of the brand. However, because the price tag area is close to the bottom of the packages, it is difficult to attribute with confidence eye fixations that land between the price and the package areas to either one of them. Therefore, we aggregated fixations to the brand level (i.e., packages and price together) for the two attention variables: noting (whether the brand was fixated on at least once) and reexamination (whether the brand was fixated on at least twice). These two measures are typically used in commercial eye-tracking package tests as the primary measures of interest. Of the 8304 observations, only 6 indicated recall without noting and only 1 suggested consideration without noting. This shows that peripheral vision is not an issue in our setting and reinforces prior results that eye fixations are a valid measure of visual attention (Wedel and Pieters 2008). Note also that these six anomalous results could have been caused by error in the recording of recall and consideration. Conversely, among the 6013 cases of noting, 3949 were not recalled. This already suggests that recall is an evaluation measure, not an attention measure.

Evaluation measures. In the consideration goal condition, a research assistant recorded the names of the brands considered as participants verbalized them during the eye-tracking task. After the screen was blanked, the research assistant asked participants, "If you had to choose only one brand, which one would it be?" In the choice goal condition, the research assistant recorded the name of the one brand chosen for purchase as participants verbalized it during the eye-tracking task. After the screen was blanked, the research assistant asked participants, "Now, please tell me the names of the other brands that you considered buying, if any, when I asked you to choose one." This procedure enabled us to measure brand consideration and brand choice in both shopping goal conditions. After providing the consideration and choice information for the first category, participants followed the same procedure for the second category. Thus, participants were in the same shopping goal condition for both products.

After the second eye-tracking task was completed, the research assistant measured recall of visual attention, first for the second category (which had just been seen) and then for the first category, by asking, "Thinking of the [soap or pain relievers] that you just saw, please tell me the names of the brands that you remember seeing." The research assistant then asked the same question for the first product category. After the recall measure, participants went to a separate room where they provided information about their past brand usage for each of the 24 brands and were asked general questions about their individual characteristics. In total, each interview lasted approximately ten minutes.

Results

Breadth and Depth of In-Store Attention and Evaluation

The descriptive statistics were essentially identical for soaps and pain relievers, so we provide the average results for both categories. Participants spent less time in the choice goal condition (M = 15.5 seconds) than in the consideration goal condition (M = 19.2 seconds; F(1, 347) =

7.3, $p < .01$). This shows that the shopping goal manipulation successfully encouraged people either to focus on fast and efficient purchasing (choice goal condition) or to be more open-minded and browse the shelf without needing to make an immediate decision. Both purchase decision times are consistent with the measures recorded by in-store observation studies (Hoyer 1984; Leong 1993). The noting and reexamination probabilities (72% and 51%, respectively) were similar to what is typical in commercial package tests and highly correlated (r = .63). Recall was significantly lower (31%) than noting and reexamination, weakly correlated with attention, and strongly correlated with consideration (see Table 1). This shows that recall is biased toward preferred brands (see also Hutchinson, Raman, and Mantrala 1994) and provides additional evidence that it may not be a good proxy for visual attention (we return to this issue in the "General Discussion" section).

Only 24% of the brands (2.8 of 12) were included in the consideration set. Therefore, participants considered only a third of the brands noted and just under half the brands reexamined. These consideration sets are slightly smaller than those obtained in the ASSESSOR studies, perhaps because we did not have multiple product variants per brand (Hauser and Wernerfelt 1990). As Table 1 shows, consideration was weakly correlated with noting and reexamination and strongly correlated with recall and choice. This shows that noting is not a direct proxy for brand consideration and that attention and evaluation need to be modeled separately. In addition, the positive correlation between attention and evaluation does not show whether in-store factors caused consideration or whether people looked at the brands already in their long-term consideration sets.

The results for the two brands that no participant had seen before (Simple soap and Nurofen pain reliever) provide a simple empirical test of the effects of attention on evaluation. As expected, we found that recall, consideration, and choice increased with the number of in-store fixations on these brands. For example, brand choice increased from zero among people who never fixated on these brands to 3.6% among people who fixated on them more than ten times ($\chi^2(1) = 7.1$, $p < .01$). Because participants had never seen these brands before the study, we can safely assert that in-store eye fixations caused these increases in recall, consideration, and choice and were not themselves caused by memory-based out-of-store factors, such as prior usage.

TABLE 1
Correlation Between Attention and Evaluation Measures

	Attention		Evaluation		
	Noting	Reexamination	Recall	Consideration	Choice
Noting	1.00				
Reexamination	.63	1.00			
Recall	.13	.14	1.00		
Consideration	.11	.13	.64	1.00	
Choice	.08	.10	.40	.54	1.00

Overall, these descriptive results show that in-store attention is limited and that higher attention can increase consideration and choice for new brands. However, the low number of observations and the low purchase scores for the two new brands prevent us from obtaining reliable results regarding which specific in-store marketing activity was most responsible for the in-store attention that led to the improved purchase probabilities. Even if we had more observations for these two brands, it would be important to study the effects of in-store factors for the other, established brands. In the next section, we examine this issue for all brands by estimating five categorical (logistic or multinomial) regressions, one for each dependent variable. As we describe in the Web Appendix (see http://www.marketingpower.com/jmnov09), these regressions take into account the mixed (within- and between-subject) nature of the data and deal with individual heterogeneity with a random intercept model. Subsequently, we examine the direct and indirect effects of in-store and out-of-store factors using path analysis.

Regression Analyses

To take into account the repeated measures structure of the data, we estimated separate random-effects binary logistic regressions for noting, reexamination, recall, and consideration with in-store and out-of-store independent variables and with random brand and individual intercepts. For the choice data, we estimated a conditional logistic regression (i.e., McFadden's multinomial logit) because participants were constrained to choose only one brand per category, whereas they could note, reexamine, recall, and consider multiple brands. The conditional logistic regression examines how differences across brands explain which of the 12 brands was chosen. As a result, it cannot estimate the effects of consumer-specific out-of-store factors that are constant across brands for a given respondent and category (shopping goal, shopper trait, demographics, and category order).

The variable names and definitions appear in Table 2, and the model specification appears in the Web Appendix (see http://www.marketingpower.com/jmnov09). Because the effects were similar for soaps and pain relievers, we aggregated the data across both categories. Few of the interactions between in-store position and out-of-store factors were significant, and there was no significant increase in fit from including these interactions. Therefore, Table 3 reports only the parameter estimates of the models that included the interactions of the out-of-store variables with the number of facings. To facilitate the interpretation of the effect sizes, Figure 4 shows the mean noting, reexamination, recall, consideration, and choice across the different levels of the key in-store and out-of-store variables. We discuss unobserved brand and individual effects in the Web Appendix.

In-store effects. Except for left versus right position and price (which had no effect), all in-store factors had large effects on attention, but these effects carried through weakly (and not uniformly) to evaluation. The number of facings had strong and positive effects on both noting and reexamination that were marginally diminishing (as indi-

TABLE 2
Variable Names and Definitions

Attention Variables	
$NOTING_{ij}$	1 if participant i fixated on brand j at least once and 0 if otherwise.
$REEXAM_{ij}$	1 if participant i fixated on brand j at least twice and 0 if otherwise.
$ATTENTION_{ij}$	Ordered categorical variable that indicates, for each brand j and person i, whether the brand was (1) never fixated, (2) fixated exactly once, or (3) fixated at least twice.
Evaluation Variables	
$RECALL_{ij}$	1 if participant i recalled having seen brand j and 0 if otherwise.
$CONSID_{ij}$	1 if participant i considered buying brand j and 0 if otherwise.
$CHOICE_{ij}$	1 if participant i stated a choice to buy brand j and 0 if otherwise.
$EVALUATION_{ij}$	Ordered categorical variable that indicates, for each brand j and person i, whether the brand was (1) neither chosen nor considered, (2) considered but not chosen, or (3) considered and chosen.
In-Store Factors	
$FACING_{ij}$	$-1/2$ if for participant i, brand j had 4 facings, 0 for 8 facings, and $1/2$ for 12 facings.
$FACINGSQ_{ij}$	$2/3$ if for participant i, brand j had 8 facings and $-1/3$ if otherwise (= $FACING^2$).
$LEFT_{ij}$	$1/2$ if the brand was on the left-hand side of the shelf and $-1/2$ if otherwise.
$HCENTER_{ij}$	If $FACING_{ij} \leq 0$: $1/2$ if for participant i, brand j touched the center of the shelf and $-1/2$ if otherwise. If $FACING_{ij} = 1/2$: 0 because brands with 12 facings occupy the whole left or right side of the shelf, making it impossible to determine horizontal position because the brand then touches both the center and extremity of the shelf. Note that this coding makes $HCENTER_{ij}$ and $FACING_{ij}$ orthogonal.
TOP_{ij}	$1/2$ if for participant i, brand j was on the top two shelves and $-1/2$ if otherwise.
$VCENTER_{ij}$	$1/2$ if for participant i, brand j was on the middle two shelves and $-1/2$ if otherwise.
$PRICE_{ij}$	The brand's shelf price in $, z-scored (for each category, mean = 0, variance = 1).
Out-of-Store Factors	
$MEDUSE_{ij}$	$2/3$ if participant i bought brand j occasionally in the past and $-1/3$ if otherwise.
$HIGHUSE_{ij}$	$2/3$ if participant i bought brand j regularly in the past and $-1/3$ if otherwise.
$HIGHMS_j$	$1/2$ if the market share of brand j is in the top half of the category and $-1/2$ if otherwise.
$CSDGOAL_i$	$1/2$ if participant i was asked to name all the brands that he or she would consider buying and $-1/2$ if the participant was asked to name the one brand that he or she would buy.
$PRICESHOP_i$	$2/3$ if participant i rated his or her agreement with the item "When buying [soap or pain relievers], price is more important than brand" as a 6 or 7 (1 = "completely disagree," and 7 = "completely agree") and $-1/3$ if otherwise.
$VALUSHOP_i$	$2/3$ if participant i rated his or her agreement with the item "When buying [soap or pain relievers], price is more important than brand" as 3, 4, or 5 and $-1/3$ if otherwise.
$EDUC_i$	$-1/2$ if participant i has a high school degree or less, 0 if he or she has some college education, and $1/2$ if he or she has a college degree or more.
AGE_i	The mean-centered age of participant i, in decades (i.e., 3.8 = age 38).
Control Factors	
$CATORDER_i$	1 if participant i viewed this category first and 2 if it was viewed it second.
$BRAND_{kj}$	The brand-specific intercepts, equal to $11/12$ if j = k and $-1/12$ if otherwise.

cated by significant quadratic effects). Going from 4 to 8 facings increased the probability of noting the brand by 28% (from 60% to 76%) and the probability of reexamining it by 40% (from 38% to 53%), but adding another 4 facings only added an extra 7% to noting (from 76% to 82%) and an extra 19% to reexamination (from 53% to 63%). The effects of facings on the three evaluation measures were also positive and statistically significant but were linear and of a smaller magnitude. Going from 4 to 12 facings improved recall by 17% (from 28% to 33%), consideration by 18% (from 21% to 25%), and choice by 15% (from 7.7% to 8.8%).

We assessed the effects of shelf location using separate variables for horizontal and vertical positions (see Table 2). We coded the horizontal position on the shelf with two binary variables: LEFT indicated whether the brand was on the left- or right-hand side of the shelf, and HCENTER indicated whether it was in the center or at the extreme ends of the shelf. To illustrate the combined effects of LEFT and HCENTER in an intuitive way, we report in Figure 4 the mean attention and evaluation for three areas of the shelf: left, center (which combines both center left and center right), and right. As Table 3 and Figure 4 show, being located on the left- or right-hand side of the shelf made no difference to either attention or evaluation. However, brands were more likely to be noted and reexamined when they were near the center of the shelf than when they were located at its extremities (M_{Center} = 80% versus $M_{Extreme}$ = 65%), and the same pattern was evident for reexamination (M_{Center} = 59% versus $M_{Extreme}$ = 43%) but not for recall. Importantly, this effect carried through to consideration (M_{Center} = 24.1% versus $M_{Extreme}$ = 22.9%) and choice

TABLE 3
Categorical Regression Results: Unstandardized Parameter Estimates and Standard Errors

	Attention				Evaluation					
	NOTING		REEXAM		RECALL		CONSID		CHOICE	
In-Store Factors										
FACING	1.5**	(.12)	1.4**	(.10)	.50**	(.11)	.55**	(.12)	.41*	(.19)
FACINGSQ	−.38**	(.07)	−.20**	(.06)	−.01	(.06)	.00	(.07)	−.07	(.10)
LEFT	.07	(.06)	.09	(.06)	−.02	(.06)	−.05	(.07)	−.13	(.10)
HCENTER	1.5**	(.08)	1.6**	(.07)	−.06	(.07)	.06	(.09)	.27*	(.13)
TOP	.28**	(.06)	.33**	(.06)	.14*	(.06)	.15*	(.07)	.14	(.10)
VCENTER	1.3**	(.07)	1.5**	(.06)	−.04	(.06)	−.11	(.07)	−.12	(.11)
PRICE	.07	(.05)	−.02	(.05)	.11*	(.04)	.10*	(.05)	.01	(.07)
Out-of-Store Factors										
MEDUSE	.25**	(.09)	.28**	(.08)	1.5**	(.07)	2.2**	(.09)	2.0**	(.18)
HIGHUSE	.55**	(.12)	.77**	(.10)	3.0**	(.11)	4.1**	(.13)	4.5**	(.19)
MEDUSE × FACING	−.12	(.20)	−.23	(.18)	.17	(.17)	.43*	(.20)	.54	(.42)
HIGHUSE × FACING	−.09	(.27)	−.43	(.24)	.59*	(.24)	.67*	(.27)	.82*	(.40)
HIGHMS	.09	(.19)	.32	(.17)	1.7**	(.15)	1.8**	(.24)	.31	(.53)
HIGHMS × FACING	.14	(.17)	−.12	(.15)	.08	(.16)	−.52**	(.20)	−.79*	(.34)
CSDGOAL	.10	(.13)	.15	(.13)	.12	(.08)	.27**	(.09)	—[c]	
CSDGOAL × FACING	.10	(.16)	.21	(.14)	.25	(.15)	.03	(.18)	−.37	(.25)
VALUSHOP	.22	(.14)	.12	(.14)	.11	(.08)	.33**	(.09)	—[c]	
VALUSHOP × FACING	.11	(.17)	.09	(.15)	.04	(.16)	.03	(.19)	.54*	(.27)
PRICESHOP	−.01	(.22)	−.07	(.21)	−.04	(.13)	.02	(.15)	—[c]	
PRICESHOP × FACING	−.05	(.25)	−.37	(.23)	.06	(.25)	−.12	(.29)	.53	(.41)
EDUC	−.55**	(.19)	−.29	(.18)	.36**	(.11)	.07	(.12)	—[c]	
EDUC × FACING	.10	(.22)	−.03	(.20)	.07	(.21)	.09	(.25)	.82*	(.35)
AGE	.03	(.06)	.02	(.05)	.00	(.03)	−.07*	(.04)	—[c]	
AGE × FACING	−.01	(.01)	.00	(.01)	−.01	(.01)	−.01	(.01)	−.03*	(.01)
Control										
CATORDER	−.01	(.13)	−.05	(.12)	.16*	(.08)	.04	(.09)	—[c]	
Brand effects[a]	28		27		193**		164**		30**	
Participant effects[b]	1000**		1185**		80**		58**		—[d]	

*$p < .05$.
**$p < .01$.
[a]Value of omnibus test (χ^2, 18) that all brand intercepts are zero.
[b]Value of likelihood ratio test (χ^2, 1) that within-subject effects are zero (i.e., $\rho = \tau^2/[\tau^2 + \sigma^2] = 0$).
[c]Factor removed from the choice model because it is constant for all the brands in the category.
[d]Not available in a conditional logistic regression (see Web Appendix at http://www.marketingpower.com/jmnov09).

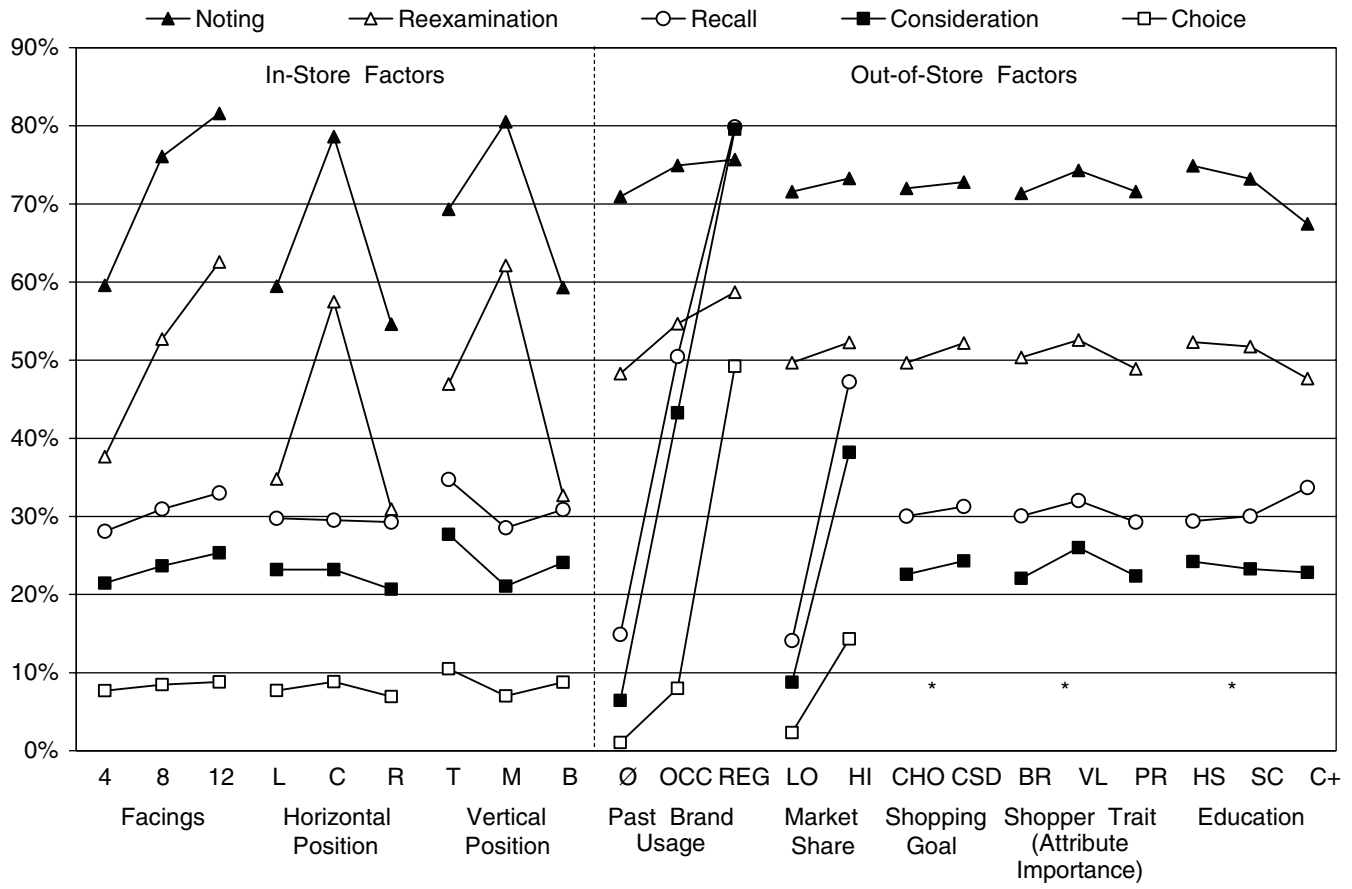
(M_{Center} = 9.0% versus $M_{Extreme}$ = 7.7%), though it was statistically significant only for choice.

For vertical position, we used a similar coding as for horizontal position. In the regressions, TOP indicated whether the brand was on the top two or the bottom two shelves, and VCENTER indicated whether it was on the middle two shelves (shelves 2 and 3) or on one of the two extreme shelves (Shelves 1 or 4; see Figure 4). To show the combined effects of these two variables, Figure 4 reports the means for the top shelf, for the middle two shelves, and for the bottom shelf. Compared with positioning the brand on the bottom shelves, positioning it on the top shelves had a positive influence on all the dependent variables, increasing noting (M_{Top} = 74% versus M_{Bottom} = 70%), reexamination (M_{Top} = 54% versus M_{Bottom} = 48%), recall (M_{Top} = 32% versus M_{Bottom} = 30%), consideration (M_{Top} = 24.4% versus M_{Bottom} = 22.6%), and choice (M_{Top} = 8.8% versus M_{Bottom} = 7.9%, though this last difference was not statistically significant). In contrast, positioning the brand on one of the middle two shelves helped attention (for noting, M_{Middle} = 80% versus $M_{Extreme}$ = 64%; for reexamination, M_{Middle} = 62% versus $M_{Extreme}$ = 40%), but these gains did not extend to evaluation, which was actually slightly lower for the middle two shelves than for the extreme shelves (though these differences were not statistically significant).

The PRICE variable, the actual shelf price of the brand the participants saw (i.e., regular or discounted), was transformed to have zero mean and unit variance within each category (as shown in Table 2). As with HIGHMS (the market-share variable), PRICE had no effect on attention, but high-priced brands were more likely to be recalled and considered.[3]

[3]We obtained the same results using regular price (instead of final price) and a binary variable for promotion (which was never statistically significant). More detailed analyses of eye fixations on the price tags themselves (versus the packages) showed that this happened because the price discount manipulation did not draw attention to prices. This is consistent with the findings in previous research regarding the low level of price search and the need to advertise price reductions (Dickson and Sawyer 1990; Woodside and Waddle 1975), which we did not do here.

FIGURE 4
Mean Attention and Evaluation Levels Across Experimental Conditions and Brand and Subject Groups



Notes: By design, the mean choice probability is 1/12 for all levels of shopping goal, shopper type, and education and therefore is not reported for these variables. For the horizontal position, L = left, C = center, and R = right. For the vertical position, T = top, M = middle, and B = bottom. For past brand usage: Ø = none, OCC = occasionally, and REG = regularly. For market share, LO = low, and HI = high. For shopping goal, CHO = choice, and CSD = consideration. For shopper trait (attribute importance), BR = brand, VL = value, and PR = price. For education, HS = high school, SC = some college, and C+ = college or more.

Out-of-store effects and interactions. As we expected, out-of-store factors primarily influenced evaluation, though some also had statistically significant effects on attention. Past usage increased noting ($M_{Regular\ user}$ = 76% versus $M_{Nonuser}$ = 71%) and reexamination ($M_{Regular\ user}$ = 59% versus $M_{Nonuser}$ = 48%), and both effects were statistically significant. However, Figure 4 shows that these effects on attention are small and marginally diminishing, whereas the effects of past usage on evaluation are massive (for recall, $M_{Regular\ user}$ = 80% versus $M_{Nonuser}$ = 15%; for consideration, $M_{Regular\ user}$ = 80% versus $M_{Nonuser}$ = 6%; and for choice: $M_{Regular\ user}$ = 49% versus $M_{Nonuser}$ = 1%).

The data support the expected interaction between usage and facings. Increasing the number of facings had a lower effect among nonusers than among past users of the brand. For example, increasing the number of facings from 4 to 12 improved consideration by 26% (from 38% to 48%) among regular users but increased it by only 8% (from 6.2% to 6.7%) among nonusers.

We also found the expected main and interaction effects of market share (captured by the HIGHMS variable) on evaluation but not on attention. Noting and reexamination were not statistically different between high- and low-market-share brands, and increasing facings improved attention equally, regardless of market share. For evaluation, however, high-market-share brands were more likely to be recalled ($M_{High\ share}$ = 47% versus $M_{Low\ share}$ = 14%), considered ($M_{High\ share}$ = 39% versus $M_{Low\ share}$ = 9%), and chosen ($M_{High\ share}$ = 14% versus $M_{Low\ share}$ = 2%). In addition, a higher number of facings increased consideration and choice more for low-market-share brands than for high-market-share brands. For example, increasing the number of facings from 4 to 12 increased choice by 60% (from 1.9% to 3%) for low-market-share brands but increased choice by only 9% (from 13.4% to 14.7%) for high-market-share brands.

We now turn to the consumer-specific variables. In general, these factors had a stronger impact on evaluation than on attention (note that these factors could not influence choice likelihood, because all participants chose only one brand). As we expected, participants in the consideration shopping goal condition paid attention to more brands and

had larger consideration sets than participants who were asked to choose only one brand (but only the latter was statistically significant). The interactions of CSDGOAL with FACING were not statistically significant. Overall, we could not replicate prior results on the difference between "browsers" and "fast and efficient" shoppers. On the positive side, this shows that the key results hold, regardless of whether consideration and choice were measured during or after the eye-tracking task.

To measure each participant's shopping trait, we asked them to rate their agreement with the item "When buying [soap or pain relievers], price is more important than brand" on a scale anchored by "completely disagree" (1) and "completely agree" (7). Participants who answered 1 or 2 were categorized as "brand shoppers"; those who answered 6 or 7 were categorized as "price shoppers"; and those who answered 3, 4, or 5 were categorized as "value shoppers" because their response indicated that they were willing to trade off brand and price. As we expected, value shoppers noted, recalled, and considered more brands (though only the latter was statistically significant), and their choices were more influenced by facings than the choices of either brand or price shoppers, who had the same attention and evaluation patterns.

With regard to demographics, we found that participants with a higher education paid attention to fewer brands but recalled more brands than participants with lower levels of education. Consistent with prior research on the effects of education and income on impulse buying, the number of facings influenced choice more among highly educated consumers. Finally, age had no impact on attention, but older participants tended to consider fewer brands and were less responsive to changes in number of facings, which is also consistent with prior results on unplanned purchasing.

Mediation Analyses

The separate analyses of noting, reexamination, recall, consideration, and choice enabled us to examine the effects of in-store and out-of-store factors on a detailed set of behaviors of important theoretical and practical interest. However, the separate analyses provided estimates of the total effects of each factor on, for example, choice but did not estimate how much of this total effect was mediated by attention and how much was a direct effect on choice. Drawing on the results of Zhang, Wedel, and Pieters (2009), who show that the effects of feature advertisements on sales are mediated by attention, it would be worthwhile to examine whether the effects of in-store factors on evaluation are also entirely mediated by attention and therefore are effective even if they have no direct effect on consideration or choice. Finally, the similarities between the patterns of responses of the two attention measures and among the three evaluation measures imply that it may be useful to construct summary measures of attention and evaluation to provide single estimates of the effects of these factors on these two constructs. To address these questions, we estimate simultaneously all the causal relationships in Figure 1 using a structural equation model with observed variables (i.e., a path analysis).

Variables and method. For the path analysis, we estimated the structural equation model shown in Figure 5 (including the brand dummies not shown). All the variables were observed except the two error terms z1 and z2. Instead of the five separate dependent variables, we used two causally related ordered dependent variables: attention and evaluation. To compute the summary measure of attention, we leveraged the nested nature of noting and reexamination (because all the brands reexamined were also noted) to compute a three-level ordered categorical variable, ATTENTION_{ij}, which indicates, for each brand j and person i, whether the brand was (1) never fixated, (2) fixated exactly once, or (3) fixated at least twice. We also used the nested nature of the consideration and choice data (because all the brands chosen were also considered) to construct a three-level ordered categorical variable, EVALUATION_{ij}, which indicates whether the brand was (1) neither chosen nor considered, (2) considered but not chosen, or (3) considered and chosen. We did not use recall data, because they were not perfectly nested (i.e., 16% of considered brands were not recalled). However, the results are similar if we incorporate recall data and compute a four-level ordered measure of evaluation by assuming that all the brands considered were also recalled.

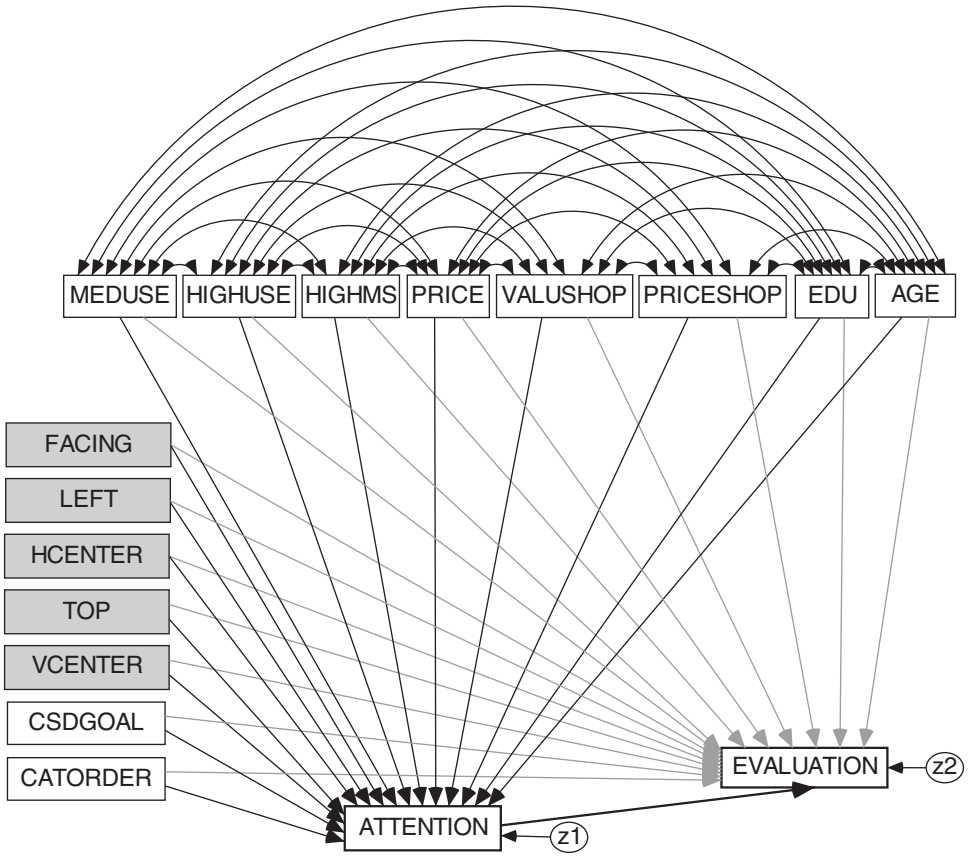
To estimate the parameters of the path analysis, we used the Bayesian estimation procedure of AMOS 16.0 (Arbuckle 2007) and generated 18,000 samples using the Markov chain Monte Carlo algorithm. The Bayesian estimation enables us to study ordered-categorical data and, thus, to relax the assumption that all the levels of the ATTENTION and EVALUATION variables are equally spaced. It also enables us to obtain the 95% credible interval of the posterior distribution of direct, indirect, and total effects, which is problematic with other estimation procedures. Regression parameters were estimated for each single arrow, and covariances were estimated for double arrows. There are no correlations between variables that were orthogonally manipulated (e.g., FACING, LEFT).

Path analysis results. Figure 6 shows three unstandardized regression coefficients for the key in-store and out-of-store variables: (1) The coefficient of the direct effect measures the impact of each factor on evaluation after controlling for the effects of attention, (2) the coefficient of the indirect effect measures the impact on evaluation that is mediated by attention, and (3) the coefficient of the total effect measures the sum of the direct and indirect effects of each factor on evaluation. Because we normalized the range of all the independent variables to 1, comparing the value of these coefficients gives us an indication of the size of their effects.

The path analysis shows that evaluation is primarily driven by out-of-store effects, so we discuss these effects first. As Figure 6 shows, indirect effects were small and often not statistically significant, showing that only a small fraction of the total effects of out-of-store factors on evaluation were mediated by attention. For example, although the indirect effects of high past usage and high market share were statistically significant, they both accounted for only 3% of the total effects of these factors on evaluation.

Among in-store variables, the role of attention as mediator is much greater than for out-of-store variables. This was especially true for the effect of facings, which was

FIGURE 5
Path Analysis Model



Notes: The path analysis model is shown here without the 20 brand intercepts, which are correlated with the measured variables in the top of the figure. Variables in the left column were experimentally manipulated. Variables in the top row were measured and therefore are correlated. Variables with dark background measure in-store effects. Light arrows represent direct effects on evaluation. Black arrows represent indirect effects through attention. Double arrows on the top represent covariances.

large and completely mediated by its effect on attention. As in the regression analyses, positioning the brand on the left- or right-hand side had no impact on either attention or evaluation. Notably, the direct and indirect effects of being on the top two shelves (versus the bottom two shelves) were both positive and statistically significant, with the indirect effect accounting for 36% of the total effect. In contrast, the positive indirect effects of a central, vertical, and horizontal position (i.e., the effects mediated by attention) were offset by their negative direct effects on evaluation. The magnitude of the negative effect was limited for horizontal center (which still had a positive and statistically significant total effect on evaluation). In contrast, the magnitude of the negative effect was large for vertical center (which had a negative but not statistically significant total effect on evaluation). Thus, the key result from this analysis is that the number of facings has a clear causal impact on evaluation that is mediated by attention, but the effects of location are mixed and attention-mediated effects are apparently offset by direct effects.

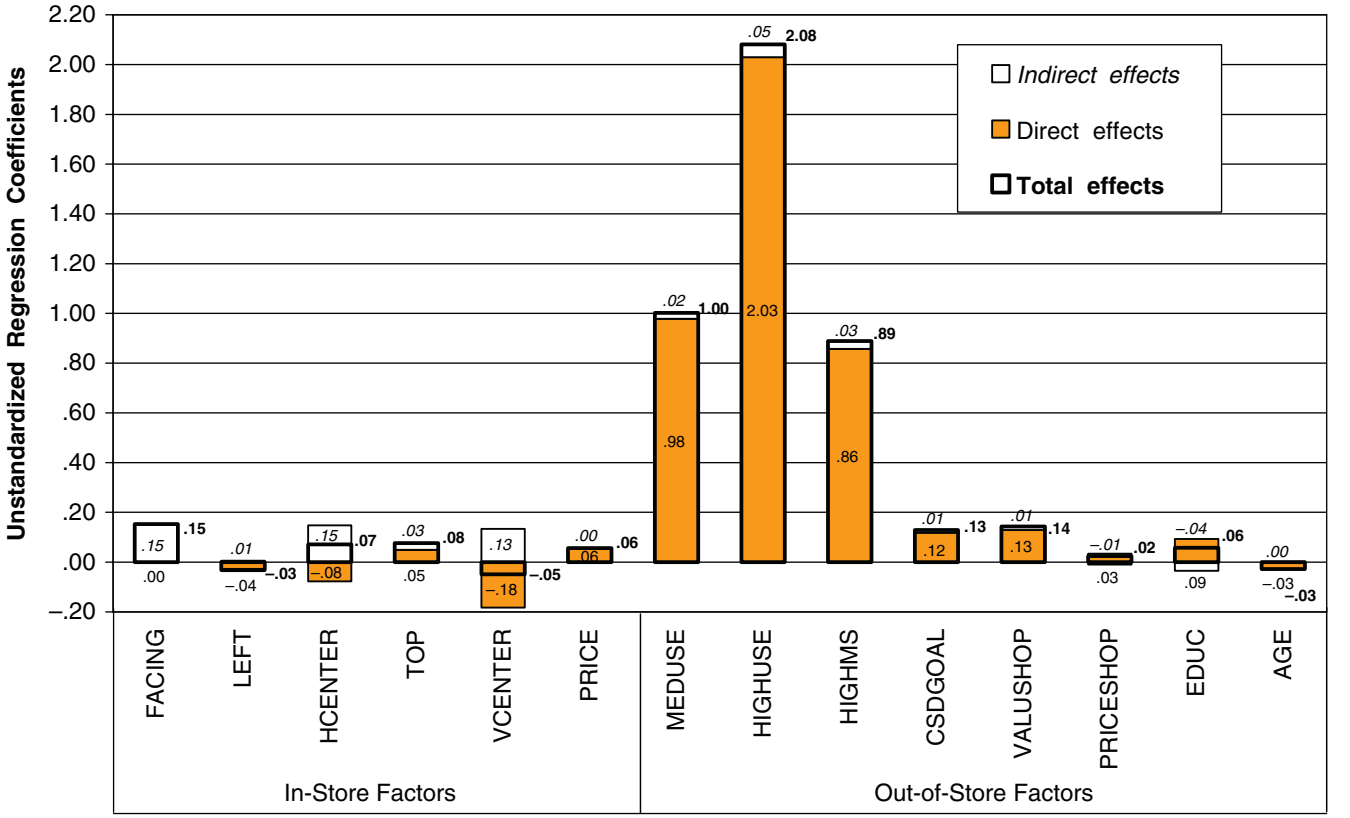
General Discussion

The objective of this research was to examine whether in-store shelf management works: (1) Does it draw attention to the brand? (2) Does it influence brand consideration and choice beyond the contribution of out-of-store factors? (3) Do these effects depend on brand- and consumer-specific out-of-store factors? and (4) How much are the observed effects on brand evaluation mediated by attention? To answer these questions, we manipulated the number of facings and the vertical and horizontal position of 12 brands of bar soap and pain relievers, while keeping total shelf space constant, and measured consumers' past usage, shopping traits, and demographics.

Effects of the Number and Position of Shelf Facings

Our main result is that the number of shelf facings strongly influences visual attention and, through attention, brand evaluation. In the best-brand scenario, for occasional users

FIGURE 6
Path Analysis Regression Parameters for In-Store and Out-of-Store Variables: Direct Effects (Controlling for Attention), Indirect Effects (Mediated by Attention), and Total Effects on Evaluation



of a low-market-share brand, doubling the number of facings improved noting by 26% (from 63% to 80%), reexamination by 33% (from 43% to 58%), consideration by 22% (from 24% to 29%), and choice by 67% (from 3% to 5%). For the average brand and consumer, doubling the number of facings increased noting by 28%, reexamination by 35%, and choice and consideration by 10%.

Therefore, our results stand in sharp contrast with Drèze, Hoch, and Purk's (1994, p. 324) conclusion that most brands would not benefit from additional facings beyond the current levels in actual markets. Rather, our results support the conclusions from prior experimental studies that find an average .2 elasticity of brand sales to shelf space increases (Campo and Gijsbrechts 2005) and those from the eye-tracking studies that find that display size is one of the most reliable drivers of attention (Wedel and Pieters 2008). Aside from the methodological differences (e.g., Drèze, Hoch, and Purk examine larger categories, and their quasi-experimental field study does not manipulate the number and position of facings independently of brand), the discrepancy with their results is likely because we studied brand consideration and choice given category purchase and did not examine purchase quantity. In contrast, Drèze, Hoch, and Purk study unit brand sales, which are influenced by brand choice but also by category incidence and purchase quantity. Empirical generalizations have shown that two-thirds of the variance in unit brand sales comes from category incidence and purchase quantity decisions and that marketing actions have a lower impact on these two decisions than on brand choice (Van Heerde, Gupta, and Wittink 2004).

Our findings on the relative effectiveness of different shelf positions for brand evaluation are broadly consistent with those of prior studies. However, our mediation analyses reveal important differences between attention and evaluation that had not been anticipated in the literature, which has so far focused on inferential (versus attentional) effects. We find that the position of facings strongly influences attention (similar to our results for number of facings) but that attention gains from shelf position do not always improve evaluation (unlike our results for number of facings). This is because shelf position, especially on the vertical dimension, also directly influences evaluation (after controlling for attention) and in a way that can either strengthen (when the brand is on the top shelf) or weaken (when the brand is on the middle shelves) the positive impact of higher attention. For example, positioning the brand on the top shelf (versus the bottom one) increased noting by 17% and choice by 20%, and 36% of the gains in terms of brand evaluation came from attention. In contrast,

placing a brand near the horizontal center of a shelf (rather than on either of its ends) increased noting by 22% and choice by 17%, but all the evaluation gains came from attention because the direct effects on evaluation were actually negative. This shows that not all position-based improvement in attention is equal in its ability to improve evaluation. It also reinforces the findings of Raghubir and Valenzuela (2008) that the effects of vertical position (and particularly the positive inferences associated with a high location) are stronger than the effects of being on the left- or the right-hand side of a shelf.

Implications for Managers

The traditional justification for in-store marketing and attention studies is that "unseen is unsold." According to various studies, a majority of brand choice decisions are made inside the store, yet consumers only evaluate a fraction of the products available (Inman, Winer, and Ferraro 2009). In this context, improved attention through in-store marketing activity should strongly influence consumer behavior at the point of purchase, and our results show that this is indeed the case, but only to a certain extent. In addition, our results show that improving attention is not a sufficient condition, because not all in-store attention drives choice.

We found that out-of-store factors influence visual attention but much less than in-store factors. This is consistent with the results of Van der Lans, Pieters, and Wedel (2008) on the primacy of bottom-up factors in guiding visual attention and search among brands in supermarket displays. Conversely, out-of-store factors have a much stronger impact than in-store factors on evaluation, and only a small fraction of this impact is mediated by attention. Thus, the overall picture that emerges from our analyses is that in-store factors have powerful effects on attention that translate into small but reliable effects on brand evaluation. These small effects build up over time and contribute to individual-specific out-of-store factors. This picture is consistent with the "trench warfare" metaphor often used for packaged goods sold in supermarkets. Large battles for attention are waged every day, but the battle lines of market share change very slowly.

Attention as brand equity. Among out-of-store factors, we found that past brand usage increases attention and not just consideration given attention or choice given consideration. The positive impact of past usage on attention is particularly valuable because without attention, brand preference cannot affect consideration and choice. In addition, past brand usage improves the effectiveness of facings in driving consideration and choice. Importantly, our results suggest that brand usage does not just increase the expected utility of the brand. It also decreases search costs and increases the effectiveness of in-store marketing, which in turn interact with expected utility to drive consideration and choice in a multiplicative way (i.e., positive double jeopardy; Alba, Hutchinson, and Lynch 1991; Pechmann and Stewart 1990). This implies, for example, that a comprehensive measure of brand equity should use eye-tracking data to measure its attention-getting impact in addition to the typical measures of recall and preference given forced exposure.

We also found that after we control for individual differences in brand usage, low-market-share brands were more responsive to facing increases than high-market-share brands. This underscores the importance of distinguishing between liking and the overall higher brand accessibility of high-market-share brands. Therefore, increasing the number of facings is particularly useful for niche brands with a loyal customer base. Finally, we found that in-store marketing works particularly well for younger, more educated, and "opportunistic" consumers, not because of differences in attention (attention patterns and the influence of in-store marketing were similar across all consumers) but rather because these consumers were more willing to consider and choose brands that were brought to their attention as a result of in-store marketing (i.e., less stickiness).

Measures of point-of-purchase effectiveness. For managers interested in developing metrics of point-of-purchase behavior, our results show that these behaviors can be clearly categorized into two groups, depending on whether they are based on attention and measured by eye movements (noting and reexamination) or are based on higher-order evaluative processes and measured by verbal reports (recall of visual attention, consideration, and choice). Although recall was nominally about attention, it should not be used as a proxy for visual attention. First, recall misses approximately two-thirds of the brands that were actually fixated. Second, and more important, recall is biased to favor highly evaluated brands. This is consistent with research on brand recall tasks showing that a sufficient amount of elaboration is necessary for recall (Hutchinson, Raman, and Mantrala 1994; Lynch, Marmorstein, and Weigold 1988). Therefore, drawing inferences about visual attention from recall data would lead to important errors. For example, shoppers with high education levels recalled more brand names but actually noted fewer brands on the shelves. Therefore, we validate the claims of Pieters and Wedel (2007) and Wedel and Pieters (2008), who show that marketers need to measure attention and not just evaluation and that eye-tracking data are required to measure attention (for alternative methods using computer simulated environments, see Burke et al. 1992; Pechmann and Stewart 1990).

Implications for Further Research

The key issue for further research is to determine why some improvements in visual attention, such as those caused by a higher number of facings, reliably improve consideration and choice, whereas others, such as those gained by positioning the brand on one of the middle shelves, do not. A possible explanation is that some enhancements in visual attention are driven by bottom-up visual characteristics, whereas others are goal directed and thus are more likely to lead to consideration and choice. For example, a position in the center of the shelf may automatically improve noting and reexamination simply because of the limited visual angle of saccades (Rayner 1998). After having fixated on a brand at one end of the shelf, consumers who want to evaluate brands located at the other end of the shelf are likely to

fixate on brands located in the center while on their way to the other end. These "stepping-stone" fixations may mostly serve the "where" (orientation) component of attention rather than the "what" (identification) component (Liechty, Pieters, and Wedel 2003). In support of this speculation, we found that the mean and variance of the duration of eye fixations (gaze) were shorter for the 25% of fixations located nearest to the center of the shelf than the 25% of fixations farther away from the center (M_{Center} = .249 milliseconds versus $M_{Extreme}$ = .270 milliseconds; t = 3.0, $p < .05$; σ^2_{Center} = .09 versus $\sigma^2_{Extreme}$ = .14; Levene statistic (1) = 3.9, $p < .05$). This is also consistent with prior results showing that gaze duration is shorter for less informative objects (Henderson and Hollingworth 1999).

Marketplace metacognitions provide another explanation for the dissociation between attention and evaluation. As Buchanan, Simmons, and Bickart (1999) posit, it may be that people homogeneously expect that a higher number of facings indicates an important brand. In contrast, there may be more heterogeneity in the inferences people make based on the shelf location of the brands. For example, Raghubir and Valenzuela (2008) find that people who wanted to buy premium brands tended to choose brands on the right-hand side of horizontal displays, whereas people who wanted to buy value brands preferred those in the center. In contrast, there is converging evidence from a variety of studies that a high vertical position is universally associated with positive evaluation and with power (Meier and Robinson 2004; Schubert 2005). Therefore, an explanation of our results may simply be that the participants had a preference for premium soaps and pain relievers and thus avoided those in the center of the shelf and favored those on the top shelf.

Understanding consumer decision making at the point of purchase would also benefit from better measurement of the dependent and independent variables. For example, it would be helpful to directly measure the effects of brand accessibility and liking and to examine how they interact with in-store factors. Another issue would be to examine whether there are any additional mediators between attention and evaluation and whether some factors moderate the attention-to-evaluation path. More generally, it would be useful to study the extent to which attention, consideration, and choice may simply be indicators with different thresholds of the same latent construct (e.g., the brand's utility) or whether they represent qualitatively different decisions. Our finding that attention is largely influenced by factors other than those that influence choice indicates that it may be a causal (formative) antecedent of choice and not simply another reflective indicator of the same construct. To address this issue, researchers would need to build an integrative model of attention, consideration, and choice that uses all the information collected here. Such a model would also show whether researchers need to measure attention and choice or whether they can infer these stages with the choice data alone, as is typically done in such multistage models.

REFERENCES

Alba, Joseph W., J. Wesley Hutchinson, and John G. Lynch Jr. (1991), "Memory and Decision Making," in *Handbook of Consumer Behavior*, Thomas S. Robertson and Harold H. Kassarjian, eds. Englewood Cliffs, NJ: Prentice Hall, 1–49.

Arbuckle, James L. (2007), *Amos 16.0 Users' Guide*. Chicago: SPSS.

Barlow, Todd and Michael S. Wogalter (1993), "Alcoholic Beverage Warnings in Magazine and Television Advertisements," *Journal of Consumer Research*, 20 (June), 147–56.

Beatty, Sharon E. and Elizabeth M. Ferrell (1998), "Impulse Buying: Modeling Its Precursors," *Journal of Retailing*, 74 (2), 169–91.

Bell, David R., Daniel Corsten, and George Knox (2009), "Unplanned Category Purchase Incidence: Who Does It, How Often, and Why," working paper, Wharton School, University of Pennsylvania.

Bemmaor, Albert C. and Dominique Mouchoux (1991), "Measuring the Short-Term Effect of In-Store Promotion and Retail Advertising on Brand Sales: A Factorial Experiment," *Journal of Marketing Research*, 28 (May), 202–214.

Buchanan, Lauranne, Carolyn J. Simmons, and Barbara A. Bickart (1999), "Brand Equity Dilution: Retailer Display and Context Brand Effects," *Journal of Marketing Research*, 36 (August), 345–55.

Burke, Raymond R., Bari A. Harlam, Barbara E. Kahn, and Leonard M. Lodish (1992), "Comparing Dynamic Consumer Choice in Real and Computer Simulated Environments," *Journal of Consumer Research*, 19 (June), 71–82.

Campo, Katia and Els Gijsbrechts (2005), "Retail Assortment, Shelf and Stockout Management: Issues, Interplay and Future Challenges," *Applied Stochastic Models in Business & Industry*, 21 (4–5), 383–92.

Chandon, Pierre, J. Wesley Hutchinson, Eric T. Bradlow, and Scott Young (2007), "Measuring the Value of Point-of-Purchase Marketing with Commercial Eye-Tracking Data," in *Visual Marketing: From Attention to Action*, Michel Wedel and Rik Pieters, eds. Mahwah, NJ: Lawrence Erlbaum Associates, 225–58.

Chevalier, Michel (1975), "Increase in Sales Due to In-Store Display," *Journal of Marketing Research*, 12 (November), 426–31.

Christenfeld, Nicholas (1995), "Choices from Identical Options," *Psychological Science*, 6 (1), 50–55.

Curhan, Ronald C. (1974), "The Effects of Merchandising and Temporary Promotional Activities on the Sales of Fresh Fruits and Vegetables in Supermarkets," *Journal of Marketing Research*, 11 (August), 286–94.

Dickson, Peter R. and Alan G. Sawyer (1990), "The Price Knowledge and Search of Supermarket Shoppers," *Journal of Marketing*, 54 (July), 42–53.

Drèze, Xavier, Stephen J. Hoch, and Mary E. Purk (1994), "Shelf Management and Space Elasticity," *Journal of Retailing*, 70 (4), 301–326.

Egol, Matthew and Christopher Vollmer (2008), "Major Media in the Shopping Aisle," *Strategy+Business*, 53 (Winter), 68–79.

Fazio, Russell H., Martha C. Powell, and Carol J. Williams (1989), "The Role of Attitude Accessibility in the Attitude-to-Behavior Process," *Journal of Consumer Research*, 16 (3), 280–88.

Hauser, John H. and Birger Wernerfelt (1990), "An Evaluation Cost Model of Consideration Sets," *Journal of Consumer Research*, 16 (4), 393–408.

Henderson, John M. and Andrew Hollingworth (1999), "High-Level Scene Perception," *Annual Review of Psychology*, 50, 243–71.

Hoyer, Wayne D. (1984), "An Examination of Consumer Decision Making for a Common Repeat Purchase Product," *Journal of Consumer Research*, 11 (December), 822–29.

Hutchinson, J. Wesley, Kalyan Raman, and Murali Mantrala (1994), "Finding Choice Alternatives in Memory: Probability Models of Brand Name Recall," *Journal of Marketing Research*, 31 (November), 441–61.

Inman, J. Jeffrey and Leigh McAlister (1993), "A Retailer Promotion Policy Model Considering Promotion Signal Sensitivity," *Marketing Science*, 12 (4), 339–56.

———, Russell S. Winer, and Rosellina Ferraro (2009), "The Interplay Among Category Characteristics, Customer Characteristics, and Customer Activities on In-Store Decision Making," *Journal of Marketing*, 73 (September), 19–29.

Janiszewski, Chris (1998), "The Influence of Display Characteristics on Visual Exploratory Search Behavior," *Journal of Consumer Research*, 25 (3), 290–301.

Leong, Siew Meng (1993), "Consumer Decision Making for Common, Repeat-Purchase Products: A Dual Replication," *Journal of Consumer Psychology*, 2 (2), 193–208.

Liechty, John, Rik Pieters, and Michel Wedel (2003), "Global and Local Covert Visual Attention: Evidence from a Bayesian Hidden Markov Model," *Psychometrika*, 68 (4), 519–41.

Loftus, Elizabeth F., Hunter Hoffman, and Geoffrey R. Loftus (1999), "Eye Fixations and Memory for Emotional Events," *Journal of Experimental Psychology: Learning, Memory and Cognition*, 17 (4), 693–701.

Lohse, Gerald L. (1997), "Consumer Eye Movement Patterns on Yellow Pages Advertising," *Journal of Advertising*, 26 (1), 61–73.

Lynch, John G., Jr., Howard Marmorstein, and Michael F. Weigold (1988), "Choices from Sets Including Remembered Brands: Use of Recalled Attributes and Prior Overall Evaluations," *Journal of Consumer Research*, 15 (September), 169–83.

Meier, Brian P. and Michael D. Robinson (2004), "Why the Sunny Side Is Up: Associations Between Affect and Vertical Position," *Psychological Science*, 15 (4), 243–47.

Nedungadi, Prakash (1990), "Recall and Consumer Consideration Sets: Influencing Choice Without Altering Brand Evaluations," *Journal of Consumer Research*, 17 (3), 263–76.

Pechmann, Cornelia and David W. Stewart (1990), "The Effects of Comparative Advertising on Attention, Memory, and Purchase Intentions," *Journal of Consumer Research*, 17 (2), 180–91.

Pieters, Rik and Luk Warlop (1999), "Visual Attention During Brand Choice: The Impact of Time Pressure and Task Motivation," *International Journal of Research in Marketing*, 16 (1), 1–16.

———, ———, and Michel Wedel (2002), "Breaking Through the Clutter: Benefits of Advertisement Originality and Familiarity for Brand Attention and Memory," *Management Science*, 48 (6), 765–81.

——— and Michel Wedel (2007), "Informativeness of Eye Movements for Visual Marketing: Six Cornerstones," in *Visual Marketing: From Attention to Action*, Michel Wedel and Rik Pieters, eds. Mahwah, NJ: Lawrence Erlbaum Associates, 43–72.

Raghubir, Priya and Ana Valenzuela (2006), "Center-of-Inattention: Position Biases in Decision-Making," *Organizational Behavior and Human Decision Processes*, 99 (1), 66–80.

——— and ——— (2008), "Center of Orientation: Effect of Vertical and Horizontal Shelf Space Product Position," working paper, Baruch College, City University of New York.

Rayner, Keith (1998), "Eye Movement in Reading and Information Processing: 20 Years of Research," *Psychological Bulletin*, 124 (3), 372–422.

Russo, J. Edward and France Leclerc (1994), "An Eye-Fixation Analysis of Choice Processes for Consumer Nondurables," *Journal of Consumer Research*, 21 (September), 274–90.

Schubert, Thomas W. (2005), "Your Highness: Vertical Positions as Perceptual Symbols of Power," *Journal of Personality and Social Psychology*, 89 (1), 1–21.

Shaw, Jerry I., Jon E. Bergen, Chad A. Brown, and Maureen E. Gallagher (2000), "Centrality Preferences in Choices Among Similar Options," *Journal of General Psychology*, 127 (2), 157–64.

Van der Lans, Ralf, Rik Pieters, and Michel Wedel (2008), "Competitive Brand Salience," *Marketing Science*, 27 (5), 922–31.

Van Diepen, Paul M.J., P. De Graef, and G. d'Ydewalle (1995), "Chronometry of Foveal Information Extraction During Scene Perception," in *Eye Movement Research: Mechanisms, Processes and Applications*, J.M. Findlay, R. Walker, and R.W. Kentridge, eds. Amsterdam: Elsevier, 349–62.

Van Heerde, Harald J., Sachin Gupta, and Dick R. Wittink (2004), "Is 75% of the Sales Promotion Bump Due to Brand Switching? No, Only 33% Is," *Journal of Marketing Research*, 40 (November), 481–91.

Wedel, Michel and Rik Pieters (2008), "A Review of Eye-Tracking Research in Marketing," in *Review of Marketing Research*, Vol. 4, Naresh K. Malhotra, ed. Armonk, NY: M.E. Sharpe, 123–47.

Wilkinson, J.B., J. Barry Mason, and Christie H. Paksoy (1982), "Assessing the Impact of Short-Term Supermarket Strategy Variables," *Journal of Marketing Research*, 19 (February), 72–86.

Wood, Michael (1998), "Socio-Economic Status, Delay of Gratification, and Impulse Buying," *Journal of Economic Psychology*, 19 (3), 295–320.

Woodside, Arch G. and Gerald L. Waddle (1975), "Sales Effects of In-Store Advertising," *Journal of Advertising Research*, 15 (3), 29–33.

Zhang, Jie, Michel Wedel, and Rik Pieters (2009), "Sales Effects of Attention to Feature Advertisements: A Bayesian Mediation Analysis," *Journal of Marketing Research*, 46 (October), 669–81.